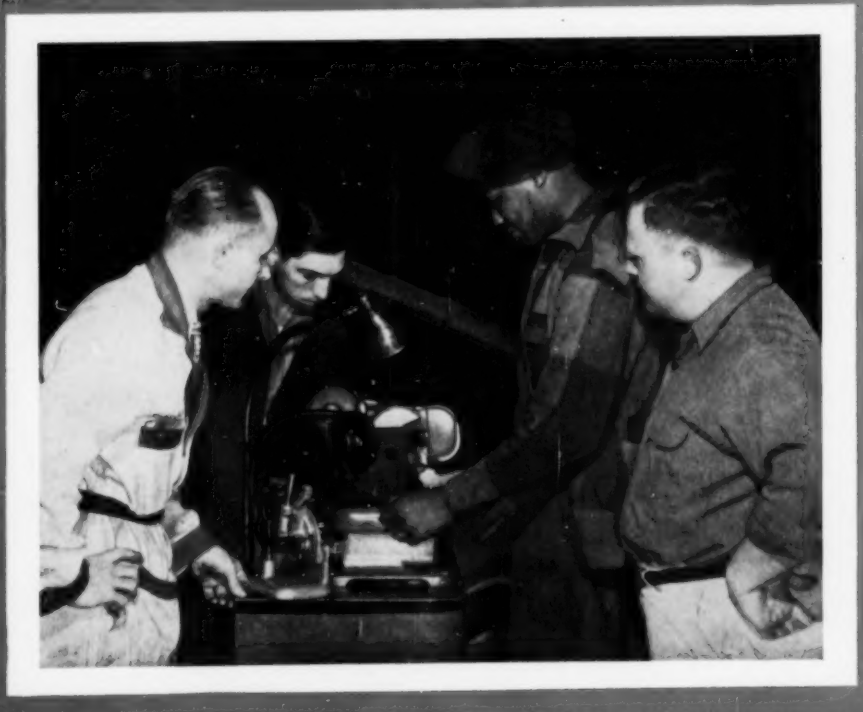
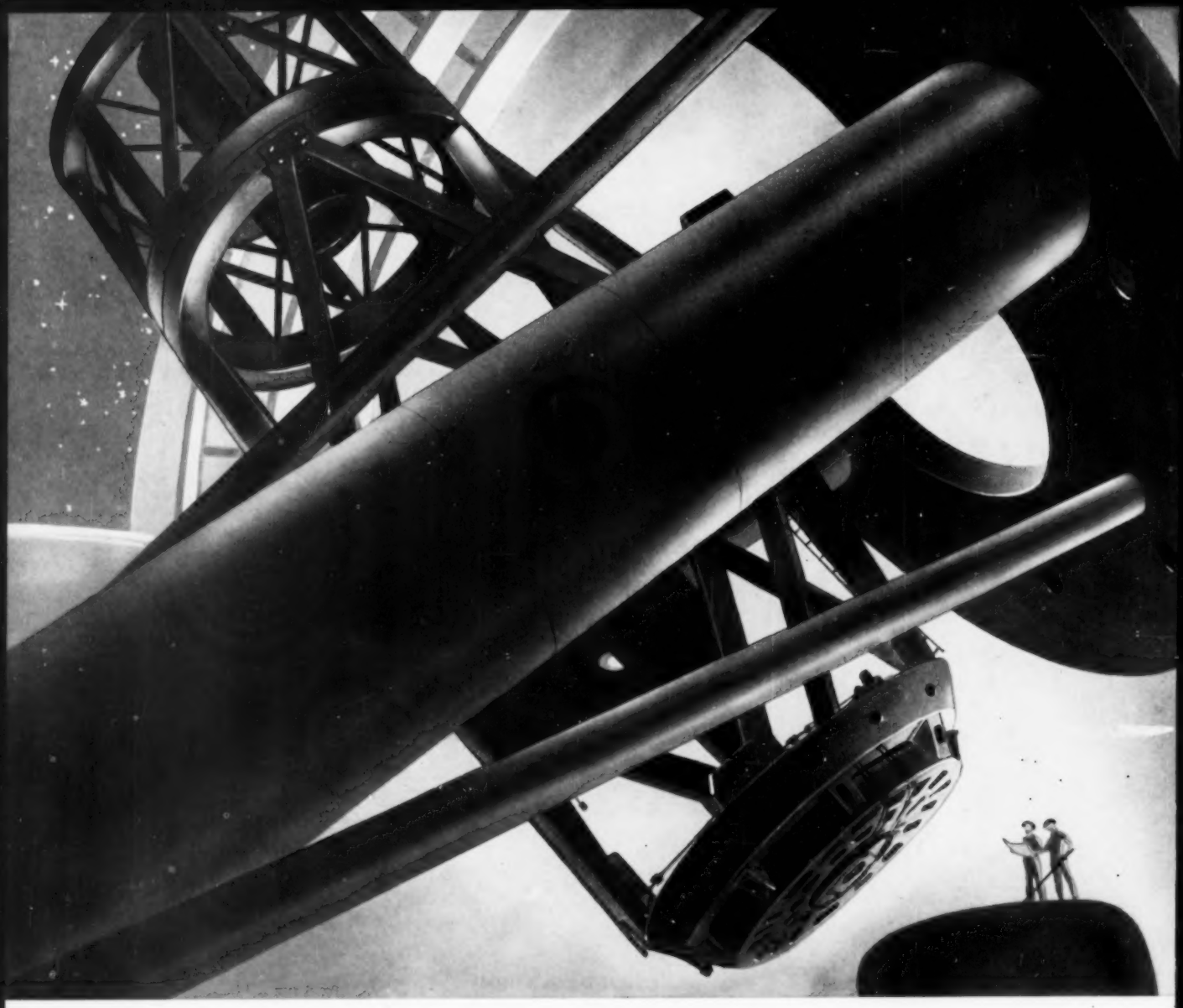
December, 1958 Vol. 47 No. 10

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine





Pioneers of the universe

The scientists' search for knowledge of the universe has proceeded at an unprecedented pace during this 20th century. Their mighty telescopes have pushed back the shrouds of the unknown many *billions* of miles into space. But who are these scientists? One thing is certain. These pioneers of the universe are yesterday's youth. But more than that, they are those fortunate few in whom the spark of achievement was kindled into a flame so that their work might transcend anything the world has ever known before.

These are important facts for the youth of today who yearn for a life of success. The ability to rise above the ordinary is not a happenstance of birth or superior energy. It is most frequently merely a matter of ideals. Somewhere during the formative days of youth comes a turning point wherein the man of tomorrow clears his thinking, begins to train himself in weighing values, starts a lifelong discrimination between the good and the shoddy which so definitely marks *every* man who rises to great success.

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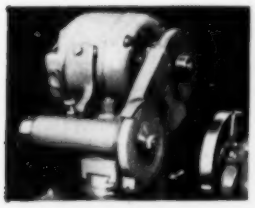
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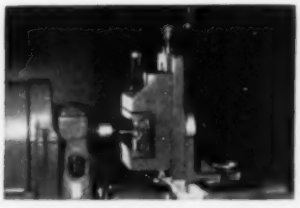
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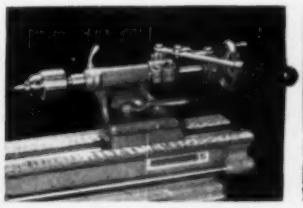
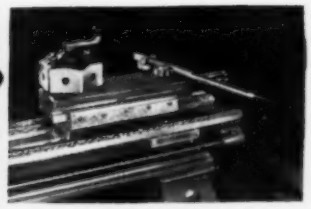
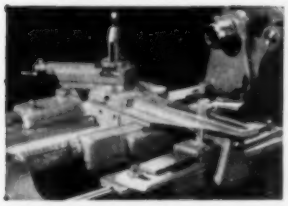
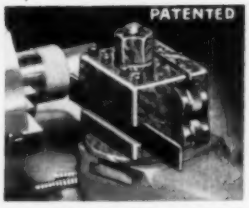

Handlever Tailstock


Handlever Bed Turret


Telescopic Taper Attachment

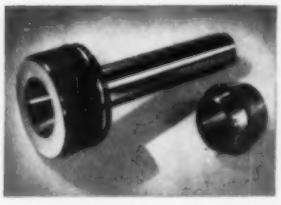
Handwheel Collet Attachment

Handlever Collet Attachment



10 in 1 Tool Holder

Ball Bearing Live Center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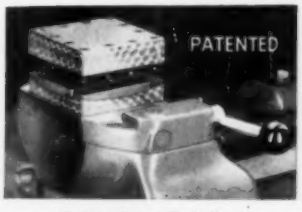

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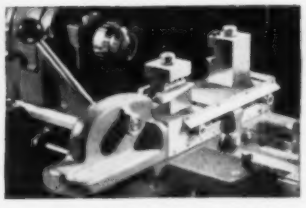
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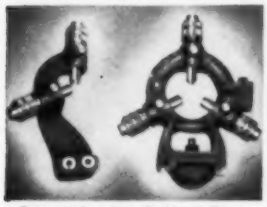
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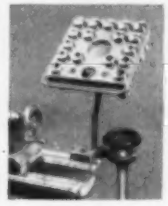
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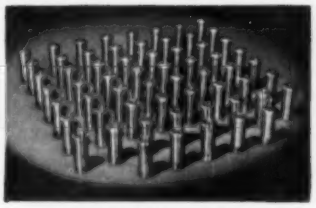
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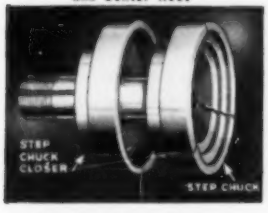

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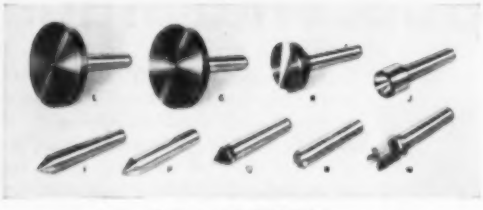
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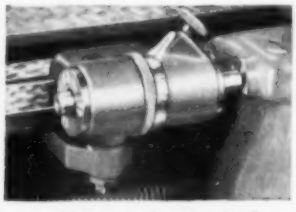
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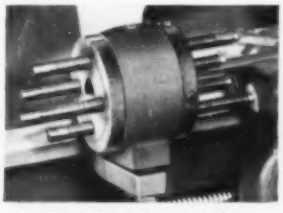
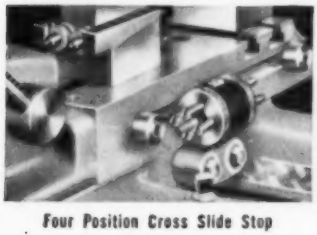

Four Position Carriage Stop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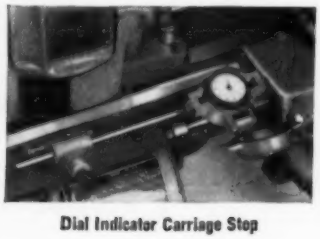
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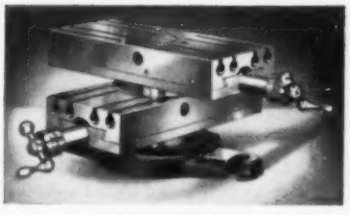
Coolant Pump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DECEMBER
1958

VOL. 47 NO. 10

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

This Month's Cover

Shown on the cover of this issue are veterans learning the technique of refacing valves. Frank Zielinski is instructor of the course.

The photograph was sent to us by John F. Jeffery, director of vocational education, School District, Erie, Pa.

The 1958 Index

Since this is the last issue in Volume 47, our circulation department will again offer to send a copy of the annual Index to those subscribers who wish to bind their copies of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. This listing includes all names of articles and authors which appeared in the magazine during the past year.

Kindly notify us, and a copy will be forwarded as soon as the Index is off the press.

Entered January 2, 1914, as Second-Class Mail Matter at Milwaukee, Wis., under Act of March 3, 1879. Copyright 1958, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, November 25, 1930. Published monthly except during July and August.

Subscription Information. — Subscription price in the United States, U.S. possessions, and Canada, $3.75 a year, payable in advance. In all foreign countries, $4.75. Single copies, 50 cents. March School Shop Annual, $1.00.

Discontinuance. — Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

Feb. 27–28. Industrial Teachers Conference, at the A. & M. College of Texas, College Station, Tex. Secretary, Leslie V. Hawkins, Texas A. & M. College, College Station, Tex.

Mar. 18–21. Illinois Vocational Association, at Pere Marquette Hotel, Peoria, Ill. Secretary, Orlin D. Trapp, Waukegan Township High School, Waukegan, Ill.

Mar. 19–20. Tennessee Vocational Association, at Nashville, Tenn. Secretary, W. A. Seeley, 111 E. Cordell Hull Bldg., Nashville 3, Tenn.

Mar. 27–28. Washington Industrial Arts Association, at Shadle Park High School, Spokane, Wash. Secretary, Carl Schmidt, N. 120 Locust St., Spokane, Wash.

AMERICAN VOCATIONAL ASSOCIATION

The Committee on Public Information of the American Vocational Association is organized and ready for work, having been authorized by the Executive Committee of the AVA in April, 1958. During the annual AVA convention in Buffalo in August, 1958, the role of the Committee and its methods of operation were considered carefully by about 35 leading members of the organization.

The initial personnel of the Committee is as follows: Dr. Melvin Barlow, Director, Division of Vocational Education, University of California at Los Angeles; Miss Pauline W. Burbrink, Director of Research, Distributive Education, Division of Extension, University of Texas; Dr. Howard A. Campion, Associate Superintendent, Division of Extension and Higher Education, Los Angeles Public Schools; Charles E. Cooper, Director of Guidance Services, Missouri State Department of Education; Miss Martha Creighton, Professor, Home Economics Education, Virginia Polytechnic Institute; Dr. Thomas Diamond, Professor-Emeritus, University of Michigan and Chairman, Editorial Board, *School Shop;* Dr. E. D. Goldman, Assistant Superintendent, Adult and Vocational Education, San Francisco Public Schools; J. F. Ingram, Supervisor, Trade and Industrial Education, Department of Education State of Alabama; Dr. J. B. Kirkland, Dean, School of Education, North Carolina State College; Jarrot A. Lindsey, Jr., Coordinator, Information and Publicity, Vocational Education Division, Georgia State Department of Education; James H. Pearson, Assistant Commissioner for Vocational Education, U. S. Office of Education; Dr. Joseph R. Strobel, Assistant Commissioner for Instructional Services (Vocational Education), New York State Education Department; Thomas A. Van Sant, Associate Superintendent of Schools, Baltimore; Arthur Walker, State Supervisor, Business Education, Virginia; Dr. M. D. Mobley, Executive Secretary of the AVA, Committee Secretary; Dr. H. M. Hamlin, Professor of Agricultural Education, University of Illinois, Chairman.

The following will serve as consultants to the Committee: Dr. James B. Conant, President-Emeritus, Harvard University and Director, A Study of the American High School; Miss Elaine Exton, Washington Correspondent, *American School Board Journal;* Dr. Philip J. Hickey, Superintendent of Instruction, St. Louis Public Schools and Immediate Past-President, American Association of School Administrators; Dr. Dean M. Schweickhard, Commissioner of Education, State of Minnesota.

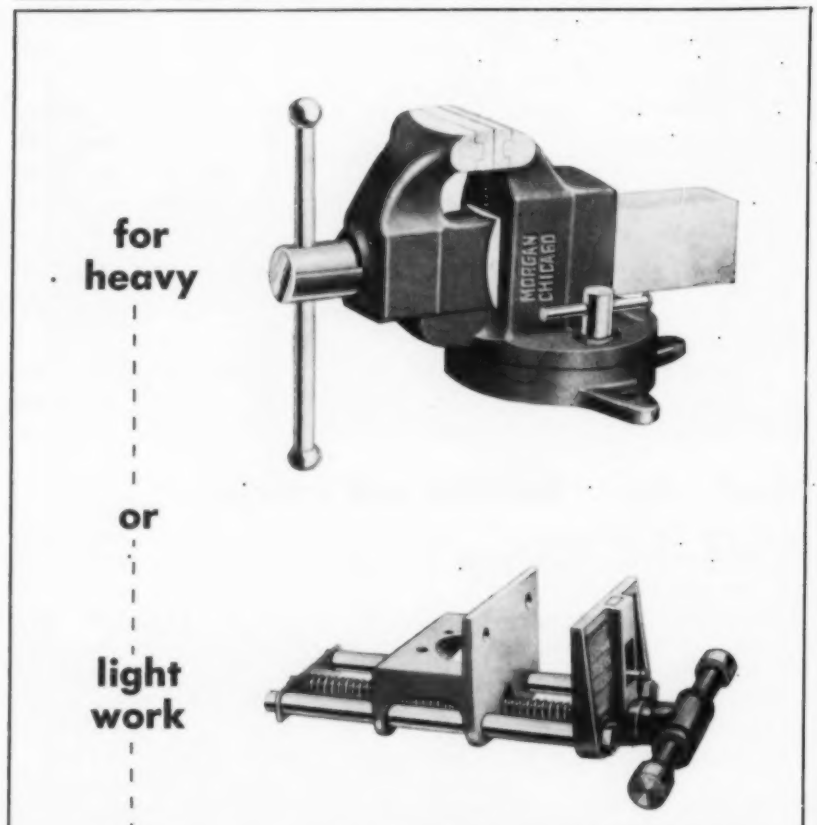
Fifty persons who are not members of the Committee have agreed to assist in its work. Others will become associated with the Committee as its work expands.

The Committee has one primary function: to help in providing the public with the information it will need in making critical local, state, and national decisions about vocational and practical arts education in the public schools during the next few years.

The Committee hopes to stimulate the formation of regional, state, and local groups with a similar function. It plans to work closely with the U. S. Office of Education, national lay and professional groups interested in education, and the media of mass communication which operate nationally. Its next step will be to determine the precise projects in which it will engage and to set up arrangements for accomplishing them.

The Committee will be positive and constructive in its efforts to provide the public with information. It will be sensitive to criticisms of vocational and practical arts education and it will note the lack of facts and the errors in thinking which some of these criticisms will reveal, but it will not reply di-

(Continued on page 6A)



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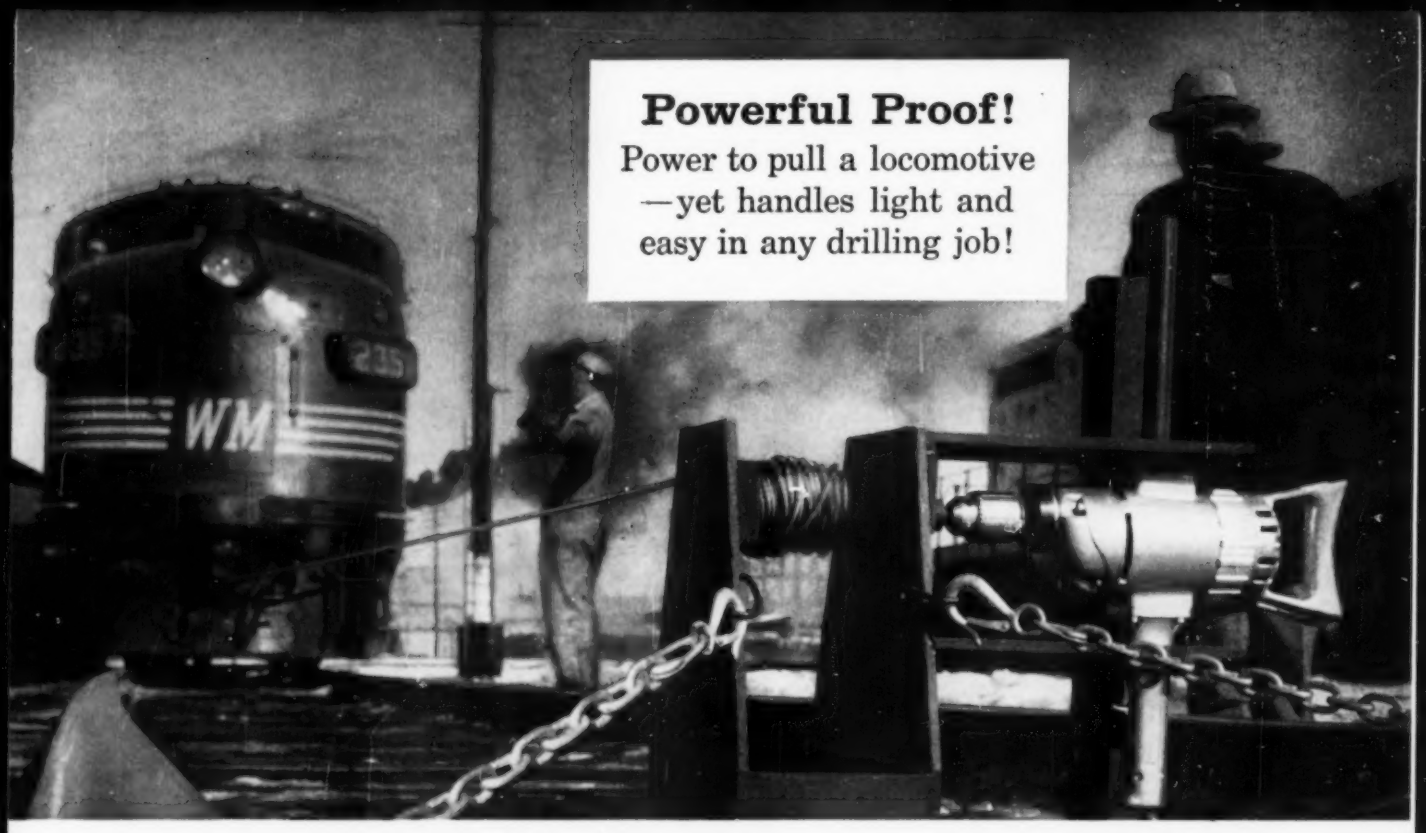

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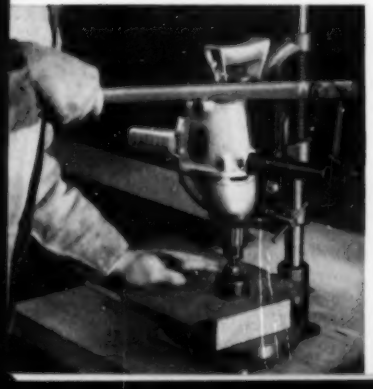

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ASSOCIATION NEWS

(Continued from page 4A)

rectly to particular individuals or groups or react directly to specific criticisms.

It is not a committee on "public relations." It assumes no direct responsibility for promoting vocational and practical arts education or for increasing the funds available for it. It has no mission to make the public love and adore vocational educators. It is concerned only that the public be well informed as it makes its decisions in the public interest regarding this field of education. — *H. H. Hamlin, Chairman, Committee on Public Information, Urbana, Ill.*

Personal News

DR. ROBERT L. THOMPSON

Dr. Robert L. Thompson, professor of education and chairman of the department of vocational education at New York University, died Friday evening, October 17, 1958, after a heart attack at his home. He was 50 years old.

Born in Bowling Green, Ohio, Dr. Thompson attended elementary and high school there and received his bachelor's degree from Bowling Green State University in 1931. He took his master's degree at New York University in 1941 and his doctor of education degree at NYU in 1947.

Professor Thompson taught industrial arts at Whitmer High School in Toledo, Ohio, from 1931 to 1934, and at Akron, N. Y., High School from 1934 to 1938. During the summer of 1938 he taught at Oswego, N. Y., State Teachers College, and in the fall of the same year joined the faculty at NYU. He became assistant professor in 1947, associate professor in 1949, and full professor and chairman of the vocational education department in 1954.

In 1939 Professor Thompson helped to organize the occupational therapy curriculum at NYU, and he directed that curriculum until 1946. He served on the faculty council and on many faculty committees in the University's School of Education. During the summer of 1951, he taught a graduate-level course at the University of Puerto Rico as part of the NYU School of Education's program there.

A frequent consultant to school systems in the metropolitan area and to the New York State Department of Education, Professor Thompson was a member of the American Industrial Arts Association and the American Vocational Association, and was a former vice-president of the New York State Industrial Arts and Vocational Education Association. He also was a faculty sponsor and laureate member of Epsilon Pi Tau, industrial education fraternity.

Professor Thompson was the author of *Leathercraft*, and a co-author of eight other books in the field of industrial arts, including *The Home Mechanic's Handbook, The Wood-Turning Lathe*, and *The Circular Saw*.

He is survived by his wife and one son.

♦ Clement J. Freund, University of Detroit, Detroit, Mich., is on leave of absence for two years to be consultant to the Government of West Pakistan on engineering and technical education.

He is located at Lahore, West Pakistan.

H. C. THAYER RETIRES

H. C. Thayer, Chief of Trade and Industrial Education of the Wisconsin State Board of Vocational and Adult Education, Madison, retired recently. He had been with the Wisconsin State Board of Vocational and Adult Education for over thirty years, including a period at Stout State College at Menomonie. Prior to this he was a teacher in various capacities.

Mr. Thayer was born on March 14, 1891, at Newton, Iowa. After completing his preparatory work, he entered the Engineering School at Highland Park College, Des Moines, Iowa. He received a Ph.B. degree in 1924 from the University of Chicago. In 1930 he completed graduate work to receive his M.A. from the University of Wisconsin, and did additional graduate work there.

From 1913 to 1917 he was instructor of industrial arts at the High School, Muskogee, Okla., and from 1917 to 1918 he taught industrial arts and vocational trade and industrial subjects at Barlow School of Industrial Arts, Binghamton, N. Y. He taught technical subjects at Stout Institute, Menomonie, Wis., and in 1924 became associated with the Wisconsin State Board of Vocational and Adult Education as teacher trainer, supervisor, and chief in the trade and industrial education department.

As a part of Mr. Thayer's activities during these years, he taught in summer sessions at either Stout or the University of Wisconsin for 35 summers (1921 through 1955).

Mr. Thayer served as the first secretary-treasurer of the Wisconsin Vocational Association; was a member of the Policy and Planning Committee for Trade and Industry, of the American Vocational Association; was president (for 10 years) of the Wisconsin

(Continued on page 14A)

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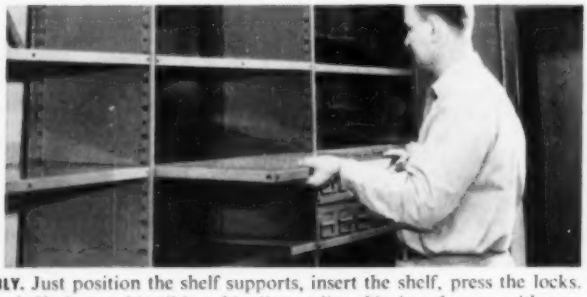

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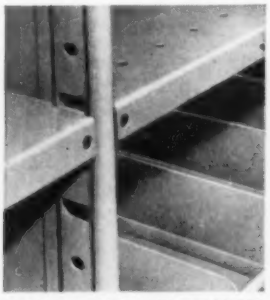

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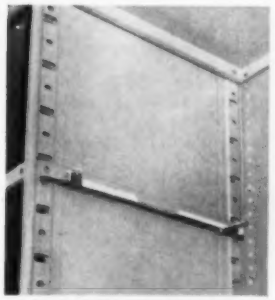

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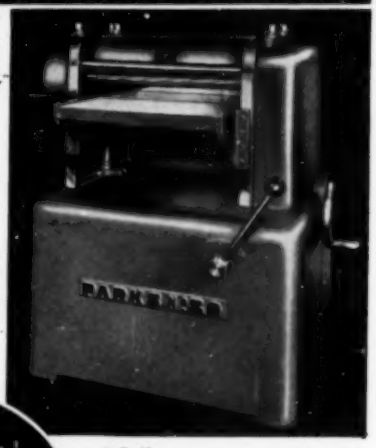

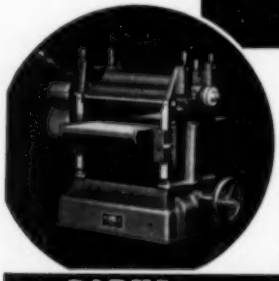

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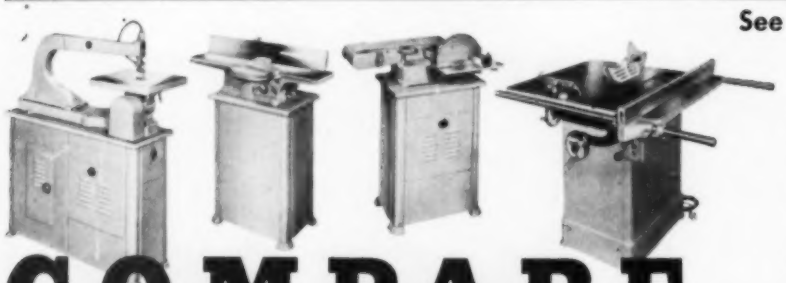

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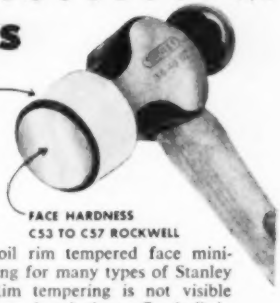

Induction coil rim tempered face minimizes chipping for many types of Stanley hammers. Rim tempering is not visible after polishing—but it does offer built-in safety.

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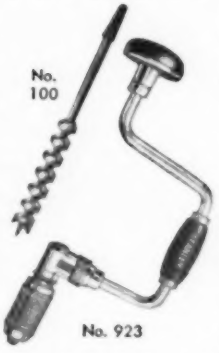
The Stanley "100 PLUS" No. 100—The Russell Jennings auger bit shown here is ideal for use with the 923 Brace. Individually tested, this double threaded screw point bit bores easily and cuts a smooth, accurate hole. Sizes 3/16" to 32/16".

The Stanley "100 PLUS" No. 923—This brace features the new, built-in Self-Centering Chuck that makes bit centering automatic and positive. It holds any size auger bit and straight shank drills from ⅛" to ½". 8, 10, 12 and 14" sweep.



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The Stanley "100 PLUS" No. 118. Here's an all steel, low angle plane that's really BOYPROOF. Only three pieces, and the locked-in cutter adjustment prevents thread stripping or lost parts.

JUNIOR JACK PLANE

Stanley No. 5¼ Junior Jack. The ideal plane for boys at the junior high school level. Fast, clean cutting, easy to adjust, it's 11½ inches of balanced performance with the usual high quality Stanley workmanship and materials. 1¾" cutter.

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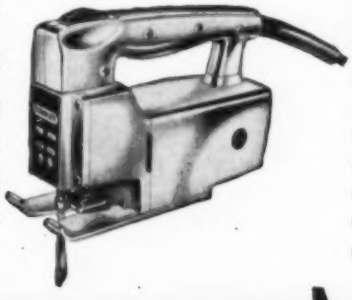

NEW ROUTER LIGHTS THE WAY

This ⅞ hp Stanley Router is packed with many new features important to teachers, valuable to students.

Safe Switch-Shaft Lock starts and stops router and automatically locks shaft. One wrench changes bits and cutters in perfect safety.

Spot Light—lights the way along the work.

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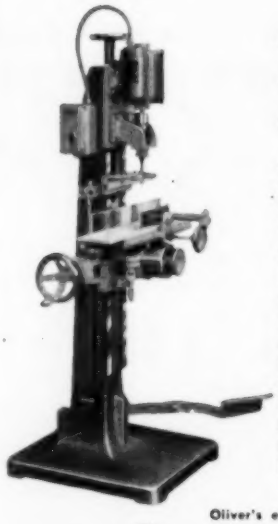

Has extra large capacity . . . easy to operate

This Hollow-Chisel Mortiser is ideal for school shops. Cuts a clean, accurate mortise up to ½" wide, 4" deep in edge of 20-inch stock using the table; 32-inch stock without the table. Has a compound table with rack and pinion feed. Table is 28" long. Has 20-inch vertical adjustment by handwheel and screw; travels 9" horizontally. Bores holes up to ¾" diameter in hard woods, 1" in soft woods, up to 4" deep. Write for bulletin No. 194D.

Oliver's extensive line of sturdy easy-to-operate machines for school shops give years of rugged service.

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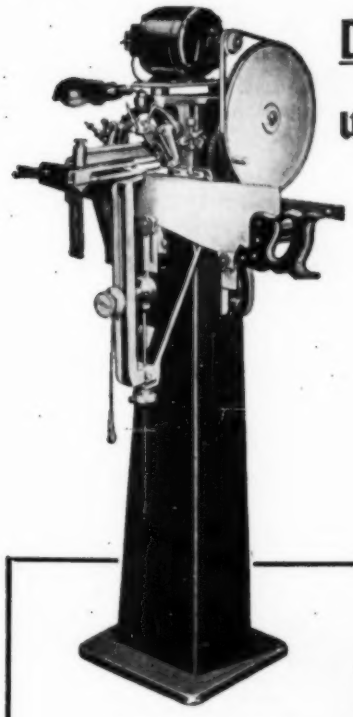

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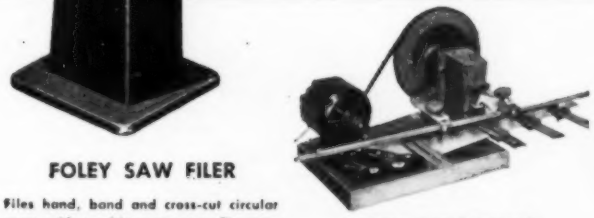
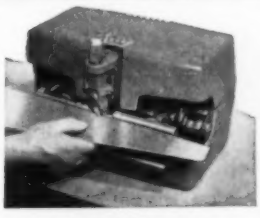


FOLEY SAW FILER

Files hand, band and cross-cut circular saws with machine accuracy. The saw is clamped in carrier which feeds it through all 3 machines for retoothing, filing, setting.

FOLEY RETOOTHER

Cuts new teeth in old saws (either straight or crowned edge) in one run through machine.



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For both hand and band saws. Sets teeth on both sides in ONE run with perfect machine accuracy.

NEW FOLEY GRINDER

Low cost Foley 314 Grinder sharpens circular saws up to 44" diam.; also dado heads, rotary power lawn mower blades, scissors, sharp edged tools. Sands, buffs, polishes.

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Greatly improved in appearance . . . entirely new in jaw, guide rod and mounting design, today's Columbian Woodworkers' Vises utilize the time-tested continuous screw mechanisms that have gained the preference of users everywhere.

Outstanding new feature is the exclusive 3-point mounting. Employing 2 slotted brackets and a center rest, this assures firm, tight vise mounting, ease of operation and longer life. Installation is reduced to a fraction of the time required by ordinary vises as the bench can be pre-drilled and bolts partially installed before vise is located. Mounting instructions and an accurate template are furnished with each vise.

When mounted, top of vise jaws is approximately ⅛" below bench top. Consequently, top edge of the bench will help to keep tools from striking metal jaws of vise. Bench top can be refinished without removing and remounting vises.

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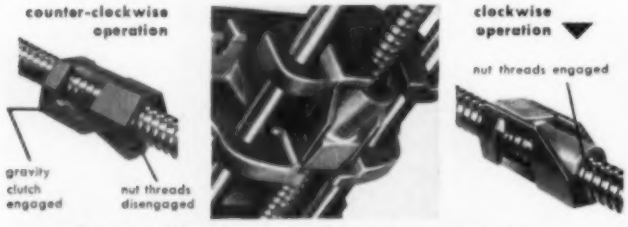
. . . for use where changes in jaw openings must be made frequently and fast!



Rapid Acting "Power-Slide" Continuous Screw Mechanism

Key to superior operation is exclusive "Power-Slide" mechanism. This incorporates a gravity friction clutch which assures positive operation (no springs) and automatically compensates for wear. Counter-clockwise operation of screw disengages mechanism, facilitating "free sliding" adjustment of jaw opening. Clockwise operation of screw engages full 180° half-nut, producing continuous inward jaw movement and high pressure holding without slippage.

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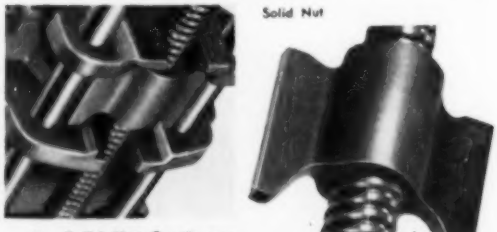
. . . for general woodworking in industrial and school shops!



▲ **Solid Nut Continuous Screw Mechanism**

Heavy steel screw is made with double lead, fast running thread to provide maximum speed of operation. Solid Nut assures long, repair-free life.

2 models of Solid Nut Continuous Screw Vises are made with special Adjustable Steel Handles for extra fast operation.

Columbian Vises and Columbian Levels are sold by leading distributors everywhere.

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
DECEMBER 1958

Amateur Radio in Industrial Arts

JAMES H. GONCE
Industrial Arts Department
Middle Tennessee State College
Murfreesboro, Tenn.

The area of electricity and communications has been described as the most neglected area in industrial arts. Two reasons are generally credited for this situation. One is the lack of training among industrial-arts teachers and the other is lack of interesting and educationally sound project material. Teacher training institutions are gradually improving their offerings in electricity and eventually the well-trained industrial-arts teacher should be as strong in this area as he is today in woodworking and drawing. But the field of electrical projects offers a constant challenge. The bell circuit is a valuable aid, but the industrial-arts program that progresses from single bell circuits to multiple bell circuits to house wiring, all on panel boards, is touching only a very small segment of modern electricity. Electrical appliance repair is also a valuable tool, but industrial-arts students cannot be satisfied with constant repair work, nor with laboratory experiments — they want to build practical projects that can be taken home for parental approval. Our problem then is to develop projects that are educationally sound, containing the fundamentals we wish to teach; projects that will arouse and hold student interest and result in a finished object the student can be proud of.

The problem is simply stated, but the problem is not simple. Our students vary widely in ability; that which is too difficult for one is too easy for another. For this reason a project area may be more valuable than a project. Within an area the student may find a level to fit his particular ability and interests. One such area is that of illumination, lamps, floodlights, signs; and another that of power, motors, generators, batteries. Any instructor can make up a long list of project areas. I should like to take one such area, wireless communication, and present some possibilities within it.

The field of amateur radio is an old and honored hobby activity, but one that very few industrial-arts teachers are familiar with; yet it contains interesting possibilities for industrial arts. What boy wouldn't be interested in building a radio transmitter that actually works, and communicating with someone hundreds of miles away? There are simple transmitters within the ability range of the average ninth-grade student and the simple crystal set is a valuable project in the junior high school. The range varies from the simple to the exceedingly complex, certainly wide enough to encompass the ability range in any industrial-arts class from the upper elementary school to the college level. It's true that before any radio transmitter can be put on the air the operator must have a license issued by the Federal Communications Commission, but the license itself is a challenge, and the instructor can use that challenge to motivate learning. Studying for such a test would not differ materially from study for other school tests, but the motivation presented by an amateur license might considerably improve the quality of work.

There are currently two basic types of licenses for amateur operators, the Novice license which is simple enough for the average high school student and the general class license which is more difficult to obtain. Both the Novice and general class license require the applicant to pass a code test and a written test. The novice is required to send and receive 5 words per minute in international Morse code and the general class applicant is required to send and receive 13 words per minute. The written test for the Novice is multiple choice and consists of simple radio law and theory. The general class test requires a fair knowledge of radio theory and practical circuits. Information concerning these tests may be obtained from the nearest F. C. C. district engineer or from the American Radio Relay League, West Hartford, Conn. The Radio Amateur's handbook published by the league is a valuable source of information for theory and project ideas.

At this point perhaps, we should present the difficulties involved in such a project area as that of wireless communication and there are two that must be overcome before this area can be practical for the average industrial-arts program. First, the typical industrial-

arts teacher lacks the knowledge to guide such a program, and second, radio supplies can be expensive. The first difficulty is a problem of self-education; the teacher should learn the fundamentals of radio communication before he can guide a unit in this area. Here it may be possible to call on the assistance of local amateurs. There are approximately 100,000 amateur radio operators in this country, and it is an unusual community that doesn't have at least one. Many communities have amateur radio clubs that would be more than willing to help. When this stumbling block is out of the way, and in removing it the industrial-arts teacher will learn a lot concerning the learning and teaching involved in radio, there remains the problem of money. Here some school money may be available, but usually the student will have to pay for the supplies he uses and it is the teacher's problem to keep cost per student to an absolute minimum. There are kits available from most radio supply houses, but they are expensive and in line with more advanced work. One source of supply that may offer valuable help is army surplus. There are vast amounts of surplus electronic equipment available and most states have an educational surplus warehouse and program for obtaining it. The surplus equipment is valuable mainly for parts, and an ingenious teacher can find numerous simple circuits to utilize the parts. There are also books available showing methods of converting surplus electronic equipment for amateur use.

Another method of handling the expense involved in wireless communication is the radio club. Interested students band together, pool their resources, and acting as a group, purchase and construct one station that all may use. This method has the added advantage of an opportunity to guide cooperative planning and work, certainly an important objective in industrial arts.

The industrial-arts teacher who has a genuine interest in electricity and communications will find amateur radio an interesting and valuable experience; furthermore that same interest, properly handled, can be used to motivate learning among his students.

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Q. S. T., American Radio Relay League, East Hartford, Conn.
C. Q., Cowan Publishing Corp., New York, N. Y.

A Defensible Oral English Program

G. L. KNOX
Haverhill Trade School
Haverhill, Mass.

— *Do you remember* standing up in front of your high school English class to give the traditional *oral report* or *current events* or *oral book* report?

This was — and all too often still is — supposed to give you poise and make you better able to express yourself effectively before a group.

But with this traditional approach, the student was supposed to start with the end result all accomplished; namely, being able to present an oral talk to a group, or to make a speech. There was no gradual build-up to this point by starting where most of the students were.

Do you remember the attendance on these *oral talk days?* Do you remember how many students did not have this lesson prepared?

To the author, the whole idea was indefensible.

This article is made up of the actual assignments given to the students. These assignments are not the only ones for the week but are given along with class discussion work, spelling, sentences, written English work, and news report assignments.

After most assignments you will find related information to help in the administration of the assignments.

These items are not mere theory; they have been used for several years by the author and with them the student makes real progress not only in his oral English and in becoming familiar with certain discussion procedures but also in his development of skills in working and getting along with others.

Small Group and Class Work

Of the following oral English topics, only these items are with the entire class participating at the same time: forum discussions, oral technical explanations, mock court trial.

The students are not assigned to certain groups or to work with certain other students. They choose their own partners and, if the assignment requires, their own chairman or leader.

The oral work recordings take place while the rest of the class is at work on other parts of the week's assignment. Other members of the class may listen in while the recording is being made or over the earphone listening system in the room while it is being played back for the participants to listen. The instructor believes that much is learned during the playback period.

Those who made the recording hear their own errors just as they make them as well as those of their friends. The students who listened in but did not make the recording learn so that they might do better when they do their recording.

Class discussions are held from time to time on such topics as: news report topics, *Reader's Digest* articles, practical English magazine problems, sentence punctuation, drill sentences, student letters projected on a screen.

Many of these discussion topics are made up by the student leaders.

A student discussion leader is in charge of the discussion with a helper who keeps score in the class record book. Each time a student takes part in the discussion by asking a question, answering a question — right or wrong — or adding to an answer he gets one point credit. When he gets a total of five points he may drop out of the discussion group to work on other assignments or he may stay in but get no more credit.

By the use of this system all students, even the most quiet ones, are worked into and given a chance in the discussion.

Schedule charts of the recorder operators might look like this sample. The operators do the scheduling of recording time for the various students:

Conversations. Three or four students in a group will hold a conversation about one or two topics. Time: three to six minutes. Schedule these for recording. Listen to the recording.

This is a very easy-starting assignment. The students will choose topics such as baseball, dating, cars, football. It gives them a start in choosing their own group, taking the responsibility to schedule the work, and in becoming familiar with the microphone and hearing themselves talk.

Interviews. Interview someone in your class. Sometime during this week you are to either interview or be interviewed. You may work with another person and go as two newspaper reporters; however, if you are being interviewed, you may not have a partner.

Since this work is to be recorded, be sure to give the names at the beginning of the reporters and the person being interviewed.

You may use actual subjects or made-up topics such as: Haverhill High's football chances; who will win the World Series next year? Mr. Blank, African explorer; Private Jose, just back from Korea.

Be ready for your interview! You may have some questions written out ready to ask. How are you going to close the interview?

Time: From three to five minutes. Be sure to schedule practice time, if you want it, and recording time with the student in charge.

Panel Discussions

1. What is a panel discussion?
2. Why do we practice panel discussions in school?
3. Suggested topics and sources of information.
4. Schedule your topics and forum members with the recorder operators for this week.
5. You need three or four panel members.
6. You need an announcer and a chairman.
7. These discussions will be recorded.

The teacher will explain and discuss with the class just what a panel discussion is and how one is carried on. It is well to emphasize the fact that a panel discussion is not just a series of speeches. But that it is a discussion among a group of interested and informed persons with the main objective of getting information across to the audience.

The duties of the chairman are to keep the discussion going and sort of tie it together. He may have lead questions, but the group should take care not to have a question and answer program.

The same student may be both the chairman and the announcer. The announcer position is added for those students who cannot or are very reluctant to take a major part in oral English work.

The members of the panel should meet to decide on the topic for their discussion. The teacher may suggest topics, such as: parking problems in our city, automobile accidents, recreation programs, fire prevention, Red Cross work, baseball topics, news event topics.

With such topics as parking problems, automobile accidents and others, the students should be encouraged to go to the Police Department, other city departments, the motor vehicle office to talk with people and secure literature about their topic. This is not only good for the discussion project but also is good public relations and good for the student.

Reporters	*Being Interviewed*	*When*	*Time*	*Score*

As follow-up on this panel discussion project, when you have a guest in to visit your class have a panel talk with him about his business. We have done this with a bank vice-president visiting class about bank loans and checking accounts.

Telling Book Report. The students schedule book reports to be recorded as they tell them. They then listen to the recording being played back. This is done with only the teller and the recorder operator involved. The rest of the class is working on other assignments except as they may listen in on the playback earphone listening system.

Selling Book Report. Book report for January: Sell your book or magazine article to another student. Record. Time: four to six minutes. Schedule with the recorder operators. Extra credit for those who act as customers when they do a good job.

The teacher will lead the class in thinking about how to sell a book in a store. Discuss such things as: How To Approach a Customer, How Much To Tell About the Book, When and How To Tell the Price, Tell the Truth.

Remind the students that they may do this report more than once if they are not satisfied with it.

Bill Presentation

1. If you have not already done so, make up a bill as part of your business project.
2. You are to talk with your customer who has just received this bill.
3. Schedule your recording time with the recorder operator for this week. You may do the recording more than once if you wish. When you are ready for a score, ask the instructor to listen.
4. Extra credit will be given to those who act the part of the customer. Everyone must present a bill.
5. The customer will ask questions and to have parts of the bill explained. If possible, have a customer from another trade.

Investigation Book Report. Each student giving a book report is seated facing four or five other students. The remainder of the class is working on other assignments.

The four or five student *investigators* then ask many questions about the story, the characters, and many details of the story.

Questions are asked for about four minutes and then the *witness* is dismissed.

Forum Discussions. Procedure:

1. Class discussions about forums.
2. Four *experts* on each forum.
3. Choose a topic.
4. Look for information.
5. Discuss with other forum members.
6. Present forum discussion to the class.

Be Prepared!

Suggested Topics:

Automobiles — Old and New
Crime

Age of Automobile Drivers
Automobile Insurance in Massachusetts
Hunting
Shop Topics
Trades
Extra Credit Assignments
Your Own Topic

Presentation Procedure:

1. Chairman will introduce the members and the topic.
2. Each member will give very short opening remarks.
3. Discussion among the members.
4. Questions from the audience.

Discussion Suggestions:

1. Speak so everyone can hear you.
2. Do not read — talk.
3. May use notes for ideas but not to read.
4. Choose an interesting topic.
5. Discussion — not four speeches.
6. May use blackboard diagrams, lists, outline charts.

Technical Explanations, Oral: Be a good listener — Listen and learn

Suggestions: Do not use too simple a subject.

1. Be prepared.
2. Have neat and attractive board diagrams ready if you plan to use them.
3. Do not stand in front of the diagram.
4. Do not talk with your back to the audience.
5. Bring actual materials and tools to class if possible. If items are small, use a larger board diagram, also.
6. Keep talking! Long pauses will lose your audience.
7. Use an assistant if necessary for speed and interest.
8. Check your preparations against the sample score sheet.
9. Try very hard not to use the same subject someone else is using. Your audience will lose interest.
10. You may use a few notes on a small card. No reading.

Listen with care to each oral explanation. You will be asked to comment and criticize for the benefit of all.

Some of the subjects chosen for this project are: How To Use a Blowtorch, Use of a Power Pipe-Threading Machine, Make-Ready in Printing.

In a high school, projects relating to hobbies could be used.

Mock Court Trial. To go into the details of this would involve much space and writing. It is the subject of another suggested article.

Each June the author invites two local lawyers to help with the planning and running of a mock trial.

Several classes join in this project to provide enough students for lawyers, jury members, witnesses for both sides. The teacher appoints the judge, clerk, three defense lawyers, and three lawyers for the prosecution.

The classes are divided into two groups: One to defend and one to prosecute. A lawyer is in charge of each side, but he is not allowed to speak out loud during court sessions. His job is to advise the student lawyers.

Witnesses are heard, evidence is presented, and the case goes to the jury for their decision.

As follow-up work, the students spend a morning visiting court in session at the local courthouse.

Equipment. You don't have a tape recorder? You can still do these suggested oral assignments. The only difference would be that the students cannot listen back to themselves. The teacher would talk over with the individual or group involved the work just completed.

Why not get a tape recorder? Try these ways:

A. Ask your school director or principal to buy one.
B. Ask your advisory board to donate one.
C. An organization of radio and TV dealers in your city may be very pleased to donate one to you as part of their advertising program. You could arrange to have the local newspaper take a picture of the presentation, etc.
D. One of your students may have a tape recorder you may use.
E. Borrow one from an interested citizen or from a dealer. The dealer will probably be very pleased to get one into your school and school system; it will be the means of his selling many to P.T.A. groups and the school administration.
F. Borrow one from your local radio station.

The idea is that if you can have one to use for a little while, then you can sell your *boss* on the idea of the school buying one for your work. Try it.

The Perfect Project

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To strive for perfection is to work toward a quality or state of being faultless. Therefore, when the cadet-teacher, the beginning teacher, or any teacher is preparing or revising a course of study, somewhere along the line he would like to high-spot the curriculum with a perfect project. What places a project in that category? A perfect project is not only concerned with the need of the community, nor with what the students can do best, or with what looks best or most colorful. It must be something that covers many educational and learning factors, has a moral value, plus application and manual appreciation, all converging on a final finished piece representing to the student a labor of keepsake and educational value. Such a project hailed by administrators, teachers, and student-teachers alike, was added to my course of study eight years ago, and has been retained in my revised curriculum because of its tremendous popularity.

The project is called "A Book of Proverbs." In our early talks the class receives a printed copy of the term's work. We discuss the listing of things to be done, we talk about basic projects, group projects, and choice projects. When we run our fingers across "A Book of Proverbs" we term it to be a combination basic and group project, and explain how more than one student is responsible for its successful completion. Sample copies of the booklet are placed on display, they are passed around and inspected. In a short time a desirable interest is manifested and practically everyone has placed it on his list of things to do in the shop. Immediately a student asks the meaning of *Poor Richard*. It is explained that this was a pseudonym mysteriously used by Ben Franklin at a time when he desired the recognition of his literary

talents. By this time the class is falling into the spirit of things. It is the general feeling of all those interested that it would be a good idea to retain this theme as a tribute to the "Patron Saint of American Printers." The motivation for this session was established the last time the class met when we talked and received printed supplements about Benjamin Franklin. To prepare the boys for this work each receives a printed instruction sheet. The instructions and specifications for this particular project are studied and its usefulness is evaluated. As curious hands are raised and questions are answered the students find that this project will consist of research work, editing, writing the copy in their notebooks, setting the type, proofing, linoleum block engraving, presswork, collating and wire-stitching or spiral binding the book together into a finished piece. During the planning period it has been decided that each student will bring in ten to twelve proverbs. Each proverb must come from "Poor Richard's Almanac" as the students have agreed. In the event that while editing their material they can only secure eight or ten choice proverbs, they may if they wish trade with a classmate. In other words, one student may have suitable proverbs that the other may lack, and by a fair exchange both can have the required number for the book. When they are ready for type composition the student sets his last name in ten point, upper and lower case, flush left. One-quarter inch or eighteen points below the name the full proverb will appear set in 14 point upper and lower case. One proverb on a page. The pupil proofreader checks all proofs. When he initials the rough corrected proof the student will go back to the proof press and pull three clean proofs for the book. The student keeps one proof. The other proofs are kept in a class envelope for safekeeping. When the twelve pages representing twelve different proverbs are finished the student sets a title page, and an introduction page. The introduction page is not only an entree to the booklet but it gives the student a simple and clear picture as to what a proverb is. The moral value of the work is thereby enhanced by this simple explanation. Meanwhile, a group of students who finished sooner are busily feeding the press, printing covers for the booklet in one or more colors. Before the pages are put together each student decides to make his own linoleum block cut of Benjamin Franklin, and print a line engraving of this same man, and also take a print of his Benjamin Franklin's autograph. It gives the student a feeling of how the first illustrations were made out of blocks of wood and graphically reproduced. When all this is done the book is ready for wire-stitching or spiral binding. The sequence of pages will be: printed top cover, title page, Franklin's autograph, picture of Franklin, introduction page, followed by proverbs in any order student deems fit to present them, ending with print of linoleum block and bottom cover. Each student now has two finished booklets. One booklet can be kept as is, and the other could be illuminated in suitable colors. As additional credit is given for extracurricular work a boy may put illumination on his manuscript after observing and studying the illumination on some of the specimens of the work done by early illuminators on printed pages.

Here you have a project that covers several areas of the graphic arts shop, and which has all the necessary motivation, interest, and learning factors a good project should have.

When this project has finally been finished with care and good supervision, what a beautiful keepsake it makes.

Poor Richard's
BOOK OF PROVERBS

A First Term Group and Individual Project

1. Size of booklet 5 x 3 in.
2. Copy for booklet in form of proverbs to come from Ben Franklin's Poor Richard's Almanac.
3. One proverb on a page.
4. Pull two proofs of each corrected proverb. One proof to instructor to be kept for book and one student keeps.
5. A suitable subject for linoleum block must be submitted. A line picture that illustrates something about Benjamin Franklin.
6. The completed book will consist of a series of proverbs, and a picture carved and printed from linoleum.
7. The booklet will have two side-wire stitches on the left side or spiral bound. The contents will be preceded by a cover

MY BOOK OF PROVERBS
Set and Printed by
YOUR NAME
INTRODUCTION PAGE

A proverb is a short, familiar saying, expressing some well-known truth or common fact of experience.

A TEACHER AND A FRIEND

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From the early morning hours,
Til the time comes round for sleep,
Even when he's tucked into his bed
Into his dreams we creep.
He tells us about filters, lens, and camera care,
And when he's finished telling us
We give an empty stare.

"I am sure you'll learn, if you try," says he.
But it's he that works and tries,
Not me —
He's not very healthy, he shouldn't go so late to bed,
But his life is his teaching I've heard it said.

What does a man such as he get in life,
He's constantly working with vigor, with strife.
His heart is in his teaching.
To his pupils he's a dear.
He sends them out into the world
With knowledge, without fear.

* Harry A. Goldstein, instructor of photography at Tucson Senior High School, is the teacher described in this little poem.

Student Evaluation — The New Way

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The day has passed when a teacher looked at a finished project and arbitrarily said, "It's a B," and then recorded the grade in his grade book. Measurement has been restricted largely to the teacher's estimate of a mark for the projects and to the results of a test for information. This method, although widely used, has resulted in a rather hazy idea of what the industrial-arts mark represents. Only recently have the students shared in the responsibility of evaluating their own projects even though such projects are the most concrete evidence available to support the fact that the students have mastered certain basic skills.

Few teachers will assign identical marks to the same projects consistently, largely due to the number of real and theoretical variables involved. Such things as the objectives of the course, the teacher's estimation of the student's ability, and differing ideas concerning craftsmanship influence in varying degrees the final mark assigned to a particular project. Thus, if industrial-arts teachers are to assign a project mark that is fair, accurate, and satisfactory to both the student and the teacher, it is essential that there be established some basic criteria for evaluation in line with the basic course objectives.

The project evaluation sheet is an attempt to measure the objectives of the course in terms of behavior. It is one way of determining the degree of progress of the individual student toward the stated objectives, and is presumed to be more valid on the basis that it contains both a teacher evaluation of the student and a student self-evaluation.

The items listed on the evaluation sheet are some of the normal behavior changes that will result from classroom instruction. They are a departure from the idea that measurement of factual knowledge represents a mark of achievement in the classroom. As the student evaluates his work in terms of objectives, he derives a deeper insight into the purpose of having objectives and becomes increasingly skilled in judging his worth with respect to those items.

One of the most favorable points in this method of evaluation is that it tends to lend more weight to individual comparisons as opposed to group comparisons. The student is marked as an individual upon what he has accomplished, as compared with what he is able to accomplish. This factor is particularly true in the industrial-arts classes where the project method of

TABLE NO. 2

Weekly Lesson Titles or Topics

Week No. Test or	*Lesson Title*
Week No. 1	The Drawing, Plan of Procedure & Bill of Material
Week No. 2	No. Grade Recorded. Safety Test — Pass or Fail
Week No. 3	Sharpening Tools
Week No. 4	Measuring and Laying Out Stock
Week No. 5	Gluing and Clamping
Week No. 6	Sawing Across & With the Grain of Wood
Week No. 7	Assemblying & Adjusting Planes
Week No. 8	Squaring Stock
Week No. 9	Shaping a Chamfer & Bevel
Week No. 10	Assembling & Adjusting Spokeshave & Laying Out & Cutting Curves
Week No. 11	Cutting & Trimming With a Chisel
Week No. 12	Adjusting & Assembling the Scraper. Smoothing a Surface by Scraping
Week No. 13	Boring and Drilling Holes
Week No. 14	Fastening With Screws. Driving & Pulling Nails
Week No. 15	Joining
Week No. 16	Preparing for Finishing
Week No. 17	Finishing
Week No. 18	No Examination Given. Time Spent Reviewing

TABLE NO. 1

Means of Exam Scores for Groups *A* and *B*

Group A Traditional		*Group B Experimental*		*High Group*	
Test No. or Week No.	**Mean**	**Test No. or Week No.**	**Mean**	**High Group**	**Points Better**
Test No. 1	59.4	Test No. 1	62.6	Experimental	03.2
Test No. 2[3]	No Score	Test No. 2	No Score	.....	...
Test No. 3	67.0	Test No. 3	63.0	Traditional	04.0
Test No. 4	89.0	Test No. 4	91.2	Experimental	02.2
Test No. 5	85.2	Test No. 5	96.6	Experimental	11.4
Test No. 6	88.0	Test No. 6	88.0	Tie	00.0
Mean of 1st Six Weeks Scores	77.7	Mean of 1st Six Weeks Scores	80.3	Experimental	02.6
Test No. 7	93.4	Test No. 7	86.4	Traditional	07.0
Test No. 8	100.0	Test No. 8	83.4	Traditional	16.6
Test No. 9	96.0	Test No. 9	92.0	Traditional	04.0
Test No. 10	78.6	Test No. 10	81.4	Experimental	02.8
Test No. 11	95.2	Test No. 11	72.6	Traditional	19.6
Test No. 12	97.2	Test No. 12	74.4	Traditional	22.8
Mean of 2nd Six Weeks Scores	93.4	Mean of 2nd Six Weeks Scores	81.7	Traditional	11.7
Test No. 13	86.6	Test No. 13	68.0	Traditional	18.6
Test No. 14	74.4	Test No. 14	57.6	Traditional	16.8
Test No. 15	87.6	Test No. 15	92.6	Experimental	05.0
Test No. 16	96.0	Test No. 16	98.0	Experimental	02.0
Test No. 17	60.2	Test No. 17	69.8	Experimental	09.6
Test No. 18[4]	No Score	Test No. 18	No Score	.....	...
Mean of 3rd Six Weeks Scores	81.0	Mean of 3rd Six Weeks Scores	77.2	Traditional	03.8
Mean of 6 Weeks Mean Scores	84.0	Mean of 6 Weeks Mean Scores	79.7	Traditional	04.3
Mean of Final Exam	74.2	Mean of Final Exam	74.4	Experimental	00.2
Mean of Final Exam & Mean of 6 Weeks Means	79.1	Mean of Final Exam & Mean of 6 Weeks Means	77.1	Traditional	02.0

An examination of the means of the final exam and the mean six weeks scores show the traditional group *A* two points above *the experimental group B*.

[3]The letter grade distribution for the examination scores throughout the experiment was derived from the following scale: 94–100 = A, 85–93 = B, 70–84 = C, 60–69 = D, Below 60 = F.

[3] and [4]No tests were given the second and eighteenth weeks, hence, no score.

teaching is used extensively. The student of low ability who works steadily at his job and works to the maximum of his ability thus receives a comparable mark to the gifted student who is suffering from a lack of initiative. He has achieved a higher standing in the class than when he is graded on the factual basis, and the diligence acquired mark of the slow learner often serves to stimulate the gifted student to greater efforts.

The project evaluation sheet used in this method of marking was developed with the aid of students for the purpose of establishing some basic criteria for marking or judging the quality of the projects completed in the shop.

When a student completes a project and submits it for a mark, he fills in a project evaluation sheet. This sheet is composed of five major areas or points of emphasis. They are:

I. Knowledge, acquired and applied
II. Effort and desirable habit formation
III. Desirable attitudes
IV. Quantity of work
V. Quality of work

Each of these headings is then broken down into more detailed explanations. For example, under the heading, Quality of work, we have the subheadings, *A*, accuracy as compared with ability, or how exact the student has been as compared with the accuracy of which he is capable; *B*, accuracy as compared with class average, or is the student more or less accurate than the average of the class; *C*, quality of the finished product; and *D*, project is well designed, looks good. This refers to whether the project is well designed, and whether its lines are symmetrical and pleasing to the eye.

Each of these headings is assigned a point value. The point values were selected with the objectives of the course in mind, and those functions which were thought to be of greater importance were assigned the higher values. The total points possible on the sheet are one hundred, or the score that would be assigned to a perfect project. Naturally, the majority of the projects will be scored at some place less than one hundred. The student reads each item, assigns himself a point value, and adds up the items to find his total point score.

The second part of the evaluation is done by the instructor. He takes the student's sheet, covers up the score made out by the student, and proceeds through the items just as the student did. He assigns each item a point value. After the instructor has finished his evaluation, the two point totals are compared in terms of a point grade scale. This scale is an arbitrary number scale set up for the interpolation of the point totals into letter grades. For example, a point total of 90 to 100 points represents a mark of *A*, 80 to 89 points represents a *B*, 70 to 79 points represents a *C*, 60 to 69 points represents a *D*, and a point score below 60 represents a failing mark.

If the two point totals fall within the

range of one letter grade on the scale, that mark is assigned to the project. However, if the totals fall in different grade ranges, the instructor and the student compare their evaluations in a personal conference and discuss the items about which they disagreed. In this manner, it is very likely that they can arrive at a suitable mark for the project.

It is extremely important from the very beginning to place the emphasis upon the fact that the mark will be a co-operative one, satisfactory to both the pupil and the teacher. Otherwise, the student may be led to believe that even though he has contributed his personal evaluation of the work, the teacher's evaluation is the final one which determines the project mark.

The results obtained from the project evaluation sheet method of project marking are very interesting and conclusive. This plan has been used on a trial basis in one of our industrial-arts shops for a period of more than a year. During that time, 10 per cent of the projects marked received an *A*, 28 per cent received a *B*, 49 per cent received a mark of *C*, 11 per cent received a mark of *D*, and 2 per cent received failing marks.

In 78 per cent of the cases the student evaluation and the instructor evaluation fell within the same mark range. Fourteen per cent had a difference of one mark range, and 8 per cent varied by two mark ranges. None of the cases varied by more than two mark ranges.

There was a tendency for the pupils who received the below average marks to overrate their work. However, this factor could have been the result of either an invalid self-evaluation or a misunderstanding of some of the terms on the evaluation sheet. It was found that generally, all students are able to produce a valid self-evaluation if they are given the opportunity and the incentive.

Interpretation of the Results

In the final column on the last line in Table No. 1, it can be observed that the traditional group ended the course two points above the experimental group. However, a close examination of the final column of figures is necessary in order to perceive exactly how the two groups compared with one another on each examination during the course of the semester.

Of the sixteen weekly examinations in which a grade was recorded, there appears to be one tie. In the fifteen remaining examinations in which the group scores were different the traditional group was ahead in eight of them and the experimental group was ahead in seven of them. Thus, it can be seen that the two groups were quite evenly matched. The fact remains however, that on some of the examinations one group showed quite a large lead over the other groups, e.g., test number twelve shows the traditional group being 22.8 points better than the experimental group while on test number five the experimental was 11.4 better than the tradition group.

The implication here, in the writer's opinion is quite evident. It is that the instructor may profit by examining his proposed lesson assignments against those which are shown in Table No. 2 and the examination score results as shown in Table No. 1 and thereby decide the best method by which to teach a particular lesson.

Implications for Further Study

Many very fine books and articles have been written on the subject of industrial-arts methods. The great majority of them, however, are based on logical thinking rather than upon experimental research. This small pilot study opens the door for further research in the field of woodworking teaching methods not only at the industrial-arts level but, at the vocational level as well.

Keeping Pace with Craftsmen Needs

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There is a serious need for craftsmen today in practically every industry. Industrial activity reached a peak in 1955 and will continue to climb, judging by predictions. The population is growing rapidly, and population growth necessitates production expansion and increased man power. Since 1950 the population has increased more than 16,308,000, and it is expected to increase to 200,000,000 during the next 15 to 20 years. More people mean more homes, more clothes, more food and beverages, more tableware, more cooking and eating utensils, more drug and chemical products and equipment, more glassware of every description. In fact more of everything. All of which calls for more man power — more craftsmen.

There are at present nearly 65 million workers employed in American industry. About 9 to 10 million — certainly no more than that — can be classified as skilled workers and technicians. That is a small fraction of the number needed.

The vital need to build up skills of America's work force has been stressed over and over again by Secretary of Labor, James P. Mitchell. "The strength of our economy," he says, "has long depended on the initiative, competence, and skill of our work force. . . . The family, the school, the armed services, industry, trade unions, government, all have a vital stake in the ways in which our citizens acquire skill and the opportunities to utilize the skills that they have mastered."

The above statement was made by Mr. Mitchell in the introduction of a statistical pamphlet entitled "The Skilled Work Force of the United States" which was issued by the U. S. Department of Labor. The pamphlet contains a series of charts clarifying the man-power situation and skilled worker

demand. Among the topics covered is that of automation and its effect in increasing the need for skill.

The expression *automation* seems to have caused a good deal of disturbance in some circles. Some people seemed to have envisioned automation as the creation of mechanical robots taking the place of men and of industrial plants controlled and operated exclusively by electronic brains. The truth is that automation is merely technological improvement that has been developing gradually since the first machines were invented. Technological improvement has increased employment — and will continue to increase employment. More skilled workers will be needed and more brains — human brains, not just electronic.

It is true that some occupations may become outmoded in time, but they will be replaced with other more highly skilled occupations for which the workers in the previous occupations can be trained. History shows that whatever occupational changes occur, they always take place gradually allowing ample time for worker readjustment and training.

The technological improvements that have taken place year after year have made America strong. The acceptance and adoption of these improvements by both labor and management, plus the skill of our workers in their application, have made it possible for America to outproduce every other country with the best. Along with our high production has come the highest wages in the world, the shortest hours, the largest employment, the greatest opportunities, the largest dividends, and the highest standards of living.

Back of the technological improvements and success in their application have been America's incomparable engineering advancement, scientific progress and inventiveness; coupled with the initiative, alertness, and eagerness of employers and workers to utilize new methods, new machines and tools.

Isadore Lubin, New York State Industrial Commissioner, who was formerly Commissioner of Labor Statistics, U. S. Department of Labor, predicts that between a third and a half of our work force will eventually have to be skilled. He made the prediction in an address at the Eastern Seaboard Apprenticeship Conference last year. He highlighted the necessity for increased man power and increased skills as a result of automation. "Our apprentice training system must be expanded," he said, "to meet the demands of a rapidly changing industrial technology."

There is no question about the necessity to expand apprenticeship activities in every major industry and trade. It is also vitally necessary to improve and broaden the provisions of every apprenticeship program to enable apprentices to acquire the increasing skills and technical knowledge required by advancing production methods and techniques. And this can be accomplished only by the most comprehensive, thorough training on the job and the most intensive technical instruction in the classroom.

The role of the Bureau of Apprenticeship is to assist employers and labor in planning and establishing adequate, up-to-date apprenticeship programs. The responsibility of conducting and carrying out the programs must be shouldered by those most concerned — the representatives of employers and labor themselves. They know better than anyone else exactly what the work is in which apprentices are to be trained, and the skills and knowledge needed to master the operations to be performed.

There must be greater participation on the part of both employers and labor, greater activity and concentration and greater investment in training.

Putting "Industry" Into Industrial Arts

ROBERT W. HAWS
Associate Professor of Education
The Ohio State University
Columbus, Ohio

Many definitions of industrial arts have evolved since Bonser[1] defined it as "A study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes." Since that time other writers and committees have presented their concept of industrial arts in a statement or definition. The writer has found and examined eleven such statements and every one is found to include a study of industry, its processes and products either by direct reference or by implication. In most cases they simply expand the Bonser idea and present more specific outcomes.

If one should ask any group of teachers in service or students preparing to teach to give a definition of industrial arts they would "recite" the one given above or some modification of it. Furthermore, if asked to list specific outcomes they would list such outcomes as "orientation" to industry and industrial processes, and to develop an understanding of industrial problems. They would also hasten to add that they were providing students opportunities to explore many fields of industrial activity for guidance values; that their students would be more wise in their selection and use of consumer goods; that they were also providing bases for hobby and avocational interests as well as other generally acceptable and respectable objectives. However, should one visit their laboratories they would very likely find many were carrying on an outdated Manual Training or Manual Arts program on a *handicraft* basis with little or no reference to methods and processes of industry. If one should inquire concerning the activities engaged in during the past year as a means of interpreting industrial practices and processes to their students he would probably get an evasive answer. If one became more specific and inquired about such things as conducted visits to a local industry, or the showing of films furnished by some basic industry, or an exhibit of industrial products and an explanation of the processes involved by a representative of that industry one would probably be given one or more of the following excuses: "lack of time," "industrial films contain advertising," "a board ruling against field trips," and other similar statements for not relating the laboratory work more directly to some aspect of industry.

Granted that some or even all the above conditions exist there appears to the writer to be one important avenue open to the teacher — namely that of organizing a class or classes for a mass production experience. If there is one thing typical of American industry it is the mass production of parts and the

[1]Bonser, Frederick G., and Mossman, Lois C., *Industrial Arts for Elementary Schools* (Macmillan Co., 1923), rev., 1935, p. 5.

assembly of these parts into a product on an assembly line basis. This idea has been resisted by many industrial-arts teachers who give lip service to orienting the student to industry, industrial processes and practices but insist upon each student doing a project from the "ground up" on a strictly handicraft basis. The writer examined the files of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine for the past five years and found only three articles[2] dealing with mass production activities. In each case the teacher involved was high in his praise of the project and believed it should be a planned activity in each laboratory.

Some of the more noteworthy outcomes of the experiences as related by the writers were opportunities:

1. To learn the importance of working together to get a job done.
2. To observe the effects of slowdowns, breakdowns, and strikes.
3. To experience the methods of American industry.
4. To learn that proper planning is a must in industry.
5. To observe leadership qualities develop through this type of project.
6. To practice safety in industry which is of primary importance.

To these the writer would add that a production project provides rich opportunities for students to accept and carry out responsibility under the direction of a member or members of their peer group.

At the secondary school level the writer believes it would be feasible to carry out the orientation and interpretation function by incorporating one or more of the following activities in the laboratory experiences.

A. Planned Trips to Typical Industries
B. Frequent Showing of Industrial Films and Slides
C. Use of Industrial Literature
D. Talks by Representatives of an Industry
E. Talks by Workers in an Industry
F. Employment in an Industry After Sixteen Years of Age
G. Mass Production Projects in the School Laboratory

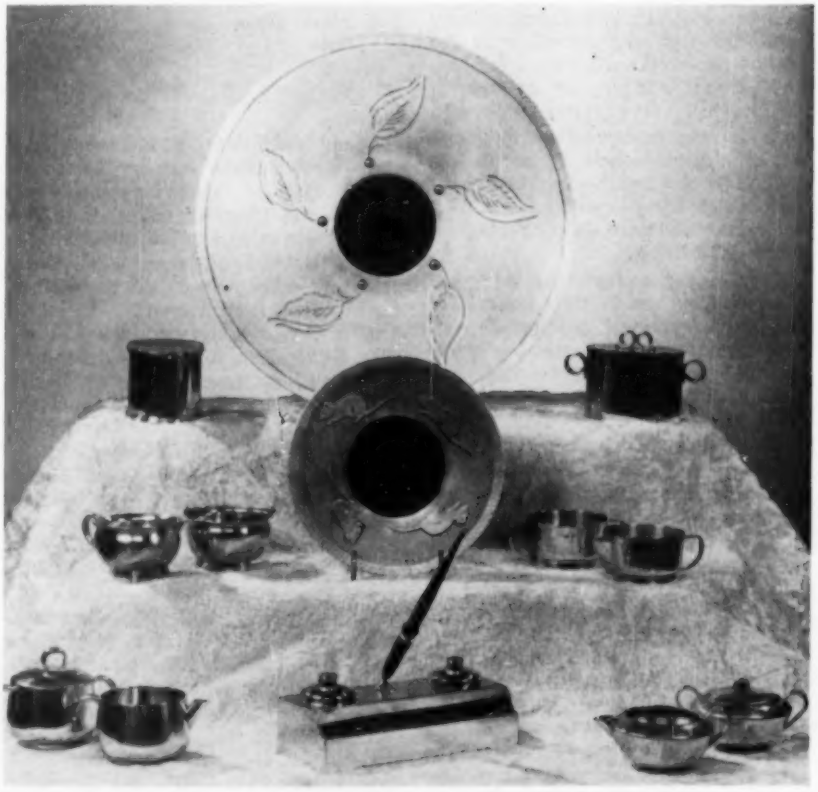
Full responsibility for the incorporation of more industrial type activities in the secondary school programs cannot be placed on the teachers at that level. They are products of the teacher education institutions and are simply "teaching as they were taught." If any considerable progress is to be made in this direction the teachers' colleges must initiate a program whereby prospective teachers have experiences in industry through summer vacation employment or part-time co-operative programs where they may have firsthand experiences with design, planning, production, and distribution of the products manufactured. Second, the colleges should de-emphasize the "craft work" aspect of the current program and place more emphasis on the methods, processes, and practices of industry. Third, it is the opinion of the writer that more use should be made at all levels of the wealth of literature available from industry in the form of charts, graphs, and booklets. A fourth source of assistance in this respect is the abundance of teaching aids in the form of films and film strips which industry has produced for free distribution. Mock-ups and models constitute a further rich source of teaching aids which help understand the functioning of industrial products. These are often available at little or no cost to the school.

The writer cannot bring this article to a close without some reference to the Junior Achievement Movement and its function as a means of interpreting American industry through actual participation in the organization of an enterprise, designing and manufacturing the product, selling the product, and finally dissolution of the company and paying the stockholders their capital investment and whatever profits were made. It would seem that this movement should be sponsored by the industrial-arts area in the secondary school to provide this rich experience for the boys and girls.

[2]Rochelle, W. C., "Yo-Yo on the Assembly Line," pp. 144–145, Apr., 1953. Soeteber, L. P., "Bringing Production Techniques Into the School Shop," pp. 135–137, Apr., 1953. Cuthbert, Allen S., and Worthington, Robert M., "Industrial Arts Mass Production," pp. 141–145, Apr., 1956.

Studies show that more accidental injuries result from falls than from any other cause except traffic accidents. Most falls can be avoided if you keep things neat and orderly, wipe up spilled liquids immediately, avoid using makeshift ladders, and do not rush about unnecessarily. — *National Safety Council.*

The East Texas oil field produced more than 75 million barrels last year, three times as much as any other field in the United States. — *Petroleum Newsnotes.*



Art metalwork produced in the classes of Emerson Wm. Manzer, associate professor, Industrial Arts Division, Wisconsin State College, Platteville, Wis. — Virtue Studio, Platteville, Wis.

A Small High School Provides Vocational Training

LEONARD HASKELL
Shop Instructor
Baker High School
Baker, Mont.

There was a large percentage of dropouts in the schools at Baker, Montana. Only the usual academic subjects for college preparatory were offered in the Baker schools. Four of five of the Baker High School graduates do not go on to college. What to do about the 80 per cent of the students who are confronted with the problem of earning a living for themselves on graduation from high school and what to do about the 5 per cent dropouts were problems to be solved by the school trustees and the administration of the schools. Evidently something had to be done if the Baker schools were to function as public education and reach the needs of youth from families of such divergent interests as industrial workers, farmers, and livestock raisers.

There had not been an industrial-arts teacher for a number of years in the Baker schools because of teacher shortage during the war years. Baker, Montana, sits on a natural-gas field. Important operations of the Montana-Dakota Utilities Company are carried on in Baker; therefore industrial workers and their families make up a large part of Baker population. As time went on, oil was discovered in the Baker area so that at the present time Baker, Montana, is an "oil town" sitting in the center of oil wells and pipe lines. There is the usual "oil" population of oil-company executives, oil prospectors, oil-rig workers, and pipe-line attendants. Baker population doubled in a few years and the character of the population changed from primarily agricultural to include a large industrial population.

The problem was how was Baker to provide vocational education for students who expected to take jobs after they were graduated from high school?

In 1946 Baker secured the services of Leonard Haskell to teach industrial arts in the high school. Haskell is a master carpenter and also skilled as a draftsman. It soon came to the attention of Haskell that trade courses were needed in Baker. Having worked at a trade, Haskell understood the advantage a skilled worker with a trade has over that of an unskilled worker. With the co-operation of L. W. Heftie, superintendent of the Baker schools, a plan was worked out whereby industrial arts could be broadened to include trade training and stay within the bounds of general education.

As usual, however, (industrial-arts departments do not like to admit it), the school shop is considered the dumping ground of a school, and students who do not or cannot make a success with mathematics, English, and history are pushed into the shop (whether or not the student is mechanically inclined) where he can play around, put in his time, and come out at the end of the term with a grade and high school

Students of the Baker High School Trade Shop, Baker Mont. — Leonard Haskell, instructor (right), and L. W. Heftie, superintendent of the Baker schools at left — Photograph by Dreher Studio, Baker, Mont.

credit. But the dumping-ground idea was put in the background in Baker, Montana. Courses were devised that would teach students skills they could use while working at a trade after they had finished high school. Students were encouraged to enroll in shop subjects that were of educational value to them, and the thought was kept before the students, "How will this course help me earn a living in the future so that I can live a better life and take better care of my family?"

Difficulties arose in attempting to correlate vocational training with the ordinary program in a high school curriculum. Several difficult problems had to be solved.

There was the problem of adequate class-period time for each student in shop since at least two periods of class attendance were required each day. It was arranged that the trade shop would co-operate with the high school program of studies by having students come to shop during periods they were not in class with their academic subjects. A student might be in shop the first and fifth periods, another the third and fifth periods, or perhaps another the second and sjxth periods. All the other students were as irregular. That meant a certain shop class would be represented in almost every period of the day. An entire class was never assembled during any one period. There were always several different classes in the shop during each class period.

The instructor's problem was to get class material to each student, keep the students busy, and keep them out of each other's way. Assignment sheets and job sheets were made for the members of each class so that with instructions found in textbooks the students would know just what they were to do and how to do it. The instructor carried on his instruction by means of demonstrations. The irregular schedule of the shop students during the class periods created a big job for the instructor because demonstrations would have to be repeated several times as not all members of a class would be present at the same time.

Students in other classes, when a demonstration was going on, were helped by student teachers. The more advanced students would help slower students when directed to do so by the instructor. The students took pride in being called on to help with teaching, and it has been the observation of the instructor that they are very thorough. Slower students do not resent being helped by their classmates because they are anxious to progress with their work. The instructor insists that there be no lost time — that all students be employed all the time they are in shop. He explains that when a workman is employed and working for wages, his employer expects him to be working all the time that he is being paid. If a workman finds time to be idle, he no longer remains a workman, and wages cease. The instructor explains that students are learning to be workmen. Their shopwork is their job, and the instructor is paying them with grades.

The instructor has definite objectives when he chooses student projects. There are certain operations and information to be learned and skills to be gained. The objectives are stressed on assignment sheets so that students know what they are expected to accomplish with each project that is built. Projects are very thoroughly planned by the students before construction is attempted in the shop. All shop students are given an elementary course in mechanical drawing, and they become skilled in making working drawings. Originality is encouraged. Drawings are done on tracing paper after which they are blueprinted. Each working drawing includes a bill of material, construction notes, material of which the project is to be made, and the type of finish.

Training in the following courses is offered in the Baker High School Trade Shop:

Hand Woodworking
Machine Woodworking
General Metalworking
Cabinetwork
Carpentry
Sheet metalwork
Engineering Drawing I
Engineering Drawing II
Architectural Drafting I
Architectural Drafting II
Cartography (map drawing)
Sheet Metal Pattern Drafting

The courses in woodwork and general metalwork are primarily hobby subjects or foundation work for trade courses.

On the completion of each project a student makes a complete report on the related information he has learned, the skills he has gained, the number of hours required to build the project, and the cost of the material used. An important feature of his report is to determine what his project would cost in dollars if he had spent equal time working for an employer at an hourly wage. By subtracting the price for which a similar object could be purchased in a store, the student arrives at the "cost of his education." The result is usually astonishing. A student realizes that education is very expensive. Finally, in his report, the student explains how he got his "money's worth" in education while building the project. He explains how the skills and information he learned will help him in the future. He points out how he thinks it will help him get a job, and how it will help him keep that job. He tells how the particular education derived from a certain project will earn him more money so that he will be better able to buy a hat for the wife, shoes for the babies, and pork chops for the table.

Demand by the high school students for courses in the trade shop seems to go in cycles. At times there will be several students studying carpentry. Cabinetwork is a popular course. Sheet-metal workers have been trained in Baker. The pendulum at the present time, however, has swung toward drafting. Girls take architectural drafting to help them with home planning in their home economics courses. Boys expect to become architectural draftsmen or perhaps go on to college and take a course in architecture. Engineering drafting students become draftsmen; some of the boys receive inspiration to become engineers and continue their education in college where they take courses in engineering.

By means of textbooks and demonstrations shop students at Baker High learn "how to do" certain operations in the particular trade they are studying, and they also learn related information. Each student keeps a complete and well-organized notebook, and there are tests frequently over the work covered. The instructor insists that accuracy and carefulness are of utmost importance so that such a habit will be formed and remain with the student throughout his entire working career. After a student can do careful and accurate work, he is permitted to *speed up* if he can do so without reducing the quality of his work.

Shop students are also encouraged to do high-quality work with their academic subjects. The instructor explains that English, mathematics, history, and science are just as important to a shopman as they are to men employed in the professions. Haskell says repeatedly, "Work hard for your English teacher; work hard for your mathematics teacher." However, if a student insists he does not want to take the academic subjects and get a high school education and diploma, he is permitted to take only shop subjects and spend his entire time in the shop and specialize in learning a trade.

The value of any educational program is evident in the success that students attain after they leave school. Here are a few of the results of the school-shop program in Baker, Montana. Ray Stevens learned sheet-metal work while in high school. He worked at the trade a year or two and then decided from the drafting courses he had taken in school that he was interested in architecture. He took a five-year course at Montana State College, and he is now

a partner with a firm of architects in Great Falls, Montana. Arnold Karch, who is a student in a college in Omaha, Nebraska, is working at carpentry to help with school expense. Karch said, "After having taken woodworking courses in the Baker school shop, I can do interior finishing. The other boys are doing rough carpenter work out in the cold, but I can work inside, hanging doors and building cabinets, and I get higher wages." Two 1956 graduates, Walter Martel and Marvin Kalland, worked as draftsmen for an architect in Glendive, Montana, during the summer and then enrolled in Montana State College where they are now studying architecture. Donald Martin, who received his inspiration in drafting class in Baker, completed civil engineering at State College where he was an honor student and graduated with honor. Martin is now working as an engineer.

A unique feature of the Baker school shop is the publishing of a mimeographed paper called the *Shopgram*. Goings on in the shop, humorous and otherwise, are mentioned in the paper. The purpose of the paper is to encourage more students of Baker High School to enroll in shop subjects. Shop students are encouraged to work hard to prepare themselves for life's work. The *Shopgram* tells parents and townspeople what the shop is doing for Baker youth. It also serves to advertise the activities of the Vocational Department of Baker High School among school people in other parts of Montana, and vicinity.

In 1950 the Baker School District added a fine new shop building to the campus of Baker High School. One end of the building houses the trade shop. Vocational agriculture, which was added to the curriculum of studies of Baker High at the time the new shop was built, is included in the other end of the building. Vocational agriculture, under the supervision of Howard Breitbach, provides agricultural education for boys who come to Baker High School from farms and ranches.

Oh yes, by the way, dropouts after the addition of vocational and agricultural education to the curriculum of Baker High School have been reduced from 5 per cent to less than 1 per cent.

Maintenance of Printing Equipment

DAVID CARL GOLDSTEIN

Teacher of Printing
Alice Deal Junior High School
Washington, D. C.

Industrial-arts teachers instructing in the field of printing seem to have had, for the most part, excellent college preparation in their subject field. Their students learn to hand-set type, operate a platen press, do linoleum block cutting and even simple book binding with great facility.

But somehow it seems, many of these excellent teachers have never been taught or learned to maintain their equipment properly. And to the visitor, supervisor, or administrator entering the shop this is glaring evidence of mismanagement.

This is most obvious in the poor condition of the composing sticks and in the rust that is permitted to form on the steel table of the paper cutter and on the stone.

Here is a project that will keep your students busy when they have a few free minutes at the end of the class period or you may set it up as an assignment for your maintenance crew to fill in some odd moments.

The composing sticks are easily polished by having a boy take a block of soft wood (readily obtainable from the school woodworking shop) and a little linotype mold polish (which can be purchased for minimum cost from a part supply house) and quickly burnish those shabby looking sticks into gleaming tools worthy of the craftsmanlike qualities you are trying to instill in your students.

Not only will this change in the appearance of the sticks have an effect on the appearance of the shop; it will also psychologically affect the attitude of the students toward the degree of care with which they handle the composing tools. It will also result in improving the ease with which the students can read the pica markings.

Be sure that your students understand that the knee must be returned to the tray of the stick from which it came in order that the high degree of accuracy that the manufacturer built into it may be maintained.

The steel table tops can be preserved by rubbing a good grade of paste wax onto the surface. Be certain that the students permit it to dry completely before rubbing it to a gloss. Not only will this remove much of the dirt, dust, and discoloration but it will prevent the rust from promptly reforming again.

Clean up your shop now. It reflects not only on your training and technical know how but also on those characteristics of thoroughness and neatness that are so much a part of the master shop instructor.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION IS FORTY-FIVE YEARS OF AGE

THE December, 1958, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, which closes Volume 47 of that periodical, reminds your editor that this magazine is no longer an infant. It made its first appearance January 1, 1914; hence, on January 1, 1959, it will be forty-five years of age.

When it was started in 1914 the publishers and editors laid down the following objectives for the new baby:

"The INDUSTRIAL ARTS magazine shall stand for the united arts, reaching out in manifold ways to accomplish one great aim. This aim embraces not alone the preparation for financial returns from industrial work, but also the preparation which the duties of efficient citizenship demand. This publication shall recognize some distinction, but certainly no conflict between manual training and vocational education."

With rare forethought these men then delimit the task for their periodical as follows: "In each issue of the magazine, we hope not only to reach the leaders, but to present something which will be of the greatest advantage to the average teacher. The expert, who is far in advance of the procession, must bear patiently some of the more elementary discussions, and the newcomer must adjust himself to the idea of learning more than the mere elementary material."

The present publishers and editor of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION feel that they have adhered closely to the directions that were laid down to them. They feel that the founders of our publication exercised excellent foresight when they laid down the formulating policies that guided our periodical during the past forty-five years. They hope that by continuing along the lines that have proved so beneficial during the past that the future will be as fruitful.

The past years have added to the number of our contributors who also must be considered when the success of our periodical is discussed. Many of them have produced wonderful articles, some good designs, and all in all have done their share to improve the magazine from year to year.

The readers, too, deserve credit, at least the great number of steady readers who have continued year after year to patronize their professional magazine thus assisting in gradually improving their professional resources.

Having mentioned what we owe to the main sources from which INDUSTRIAL ARTS AND VOCATIONAL EDUCATION receives its assistance, the contributors, the teachers who send us the designs, and the readers who make it possible for us to print the magazine, may we say one more word to the readers who send in adverse criticisms with the broad assertion that a certain article or design is all wrong, without stating what makes it so. Frequently these critics are not on our subscription list, and most generally they have never contributed anything to the magazine before.

We like criticisms of our work, but please make them so that we can do a better job thereafter. Better yet, send us a description of your own work or designs so that we can share it with our readers.

THE WISE OWL CLUB

MANY industries have such a club in their plant. These clubs are limited to those workers who have saved themselves from practically certain blindness by wearing eye protection at the time when they would otherwise have lost the sight of one or both eyes.

This club is sponsored by the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y. It was founded in 1947, and there are at present well over one million members scattered over our country who are working in plants that use it as a safety measure for their employees.

Have you ever told your students what this club stands for? Have you told them that to be eligible for membership in that club one must have been wearing safety glasses that actually saved him from losing his eyesight? Get information about the club from the National Society for the Prevention of Blindness. Probably this information will help your students make up their minds that wearing safety glasses is not so bad, and that the saving of one's eyesight is worth the little inconvenience experienced when wearing safety glasses.

Probably the teacher has heard of stories where a mechanic loses one of his eyes when a tool breaks and a piece of it flies into his unprotected eye. Or probably he knows of a genuine "Wise Owl Club" story. The youngsters gladly hear stories of this kind and probably he can convert some of his students to save their eyes by wearing safety goggles whenever they are working in the shop.

At any rate it is worthwhile to try — if you save a boy's eye you will have something to be happy about for the rest of your life.

DO YOU WANT TO BE A SUCCESS?

BERNARD HALDANE of the School of Business Administration, Fairleigh Dickinson University, Rutherford, N. J., is teaching a newly discovered three-step formula which will help individuals to be more successful. The new system is now being taught at the Rutherford and Teaneck campuses (N. J.) of Fairleigh Dickinson University, as well as to executives and professional men and women at the American Management Association in New York City.

Interviews with more than 40,000 persons over the past twenty years helped to make this discovery possible. Associated work was done with the Harvard Graduate School of Business Administration, Stanford Research Institute, the U. S. Air Force (Research and Development Command), the Society for the Advancement of Management, and other professional and management groups.

These studies showed that most people fail to find the successes they could have, because they dwell more on their mistakes, errors, failings, rather than on their successes.

People everywhere also know that you learn about what you study. When you study arithmetic, you learn about arithmetic; when you study history, you learn about history; and so we may assume that when you study mistakes, you learn about mistakes.

Study your successes — and what makes them happen. Avoid spending time on learning how you can make mistakes.

The general rule is, what you have done well before, you can do well again. And it is worth trying again, especially if you know it has given you satisfaction, happiness.

Problems and Projects

A BOW TIE RACK

D. L. GARNER

Instructor
Illinois Industrial School for Boys
Sheridan, Ill.

The student participatiing in the industrial-arts program will find that the making of the bow tie rack described herewith, provides him with additional experiences in the basic fundamentals of using wood, and woodworking tools. The instructor may use this project to help utilize the small scrap pieces of materials which accumulate in a shop.

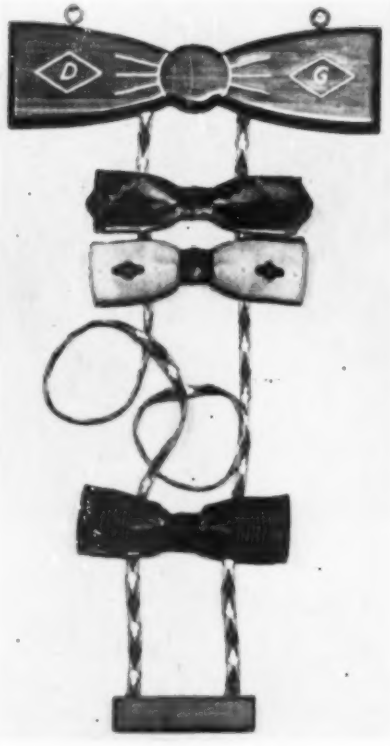
The bow tie holder not only lends itself as a learning unit, but provides a gift that is different.

Method of Procedure

1. Select stock. (Author suggests walnut or cedar.)
2. Plane to thickness.
3. Lay out design on stock, and cut to shape on band saw or jig saw.
4. Round all edges.

NOTE: This may be accomplished with a router, using a ¼-in. rounding over bit.

5. Cut diamond shape designs, initials, and other lines into face of stock. Cut ⅛ in. deep.



Bow tie rack

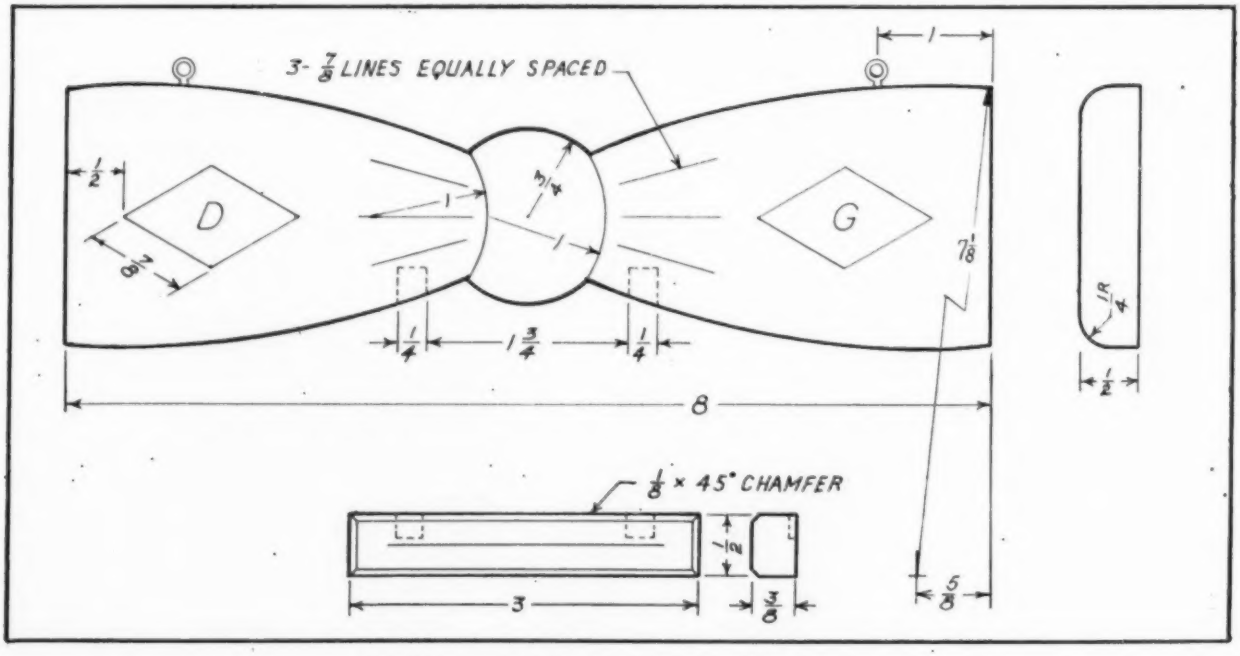
NOTE: Use router with a 1/16-in. straight bit or an electric vibro tool.

6. Cut grooves into the back of the piece for fastening shoe laces or other strips of brightly colored material. (Author used bright colored 27-in. shoe laces.)
7. Sandpaper to smoothness, and finish with No. 6/0 sandpaper.
8. Paint diamond shape designs, initials, and other lines with gold paint.
9. Select matching stock for small bar.
10. Plane to thickness.
11. Cut to desired shape.
12. Chamfer all edges.
13. Cut grooves into back of piece for fastening laces. OPTIONAL: A groove or grooves may be cut into face of bar and painted with gold paint.
14. Sandpaper to smoothness: finish with No. 6/0 sandpaper.
15. Finish both pieces natural.
16. Attach laces to pieces with small wire nails.
17. Locate and attach screw eyes.

BUILD YOUR OWN SPRAY BOOTH

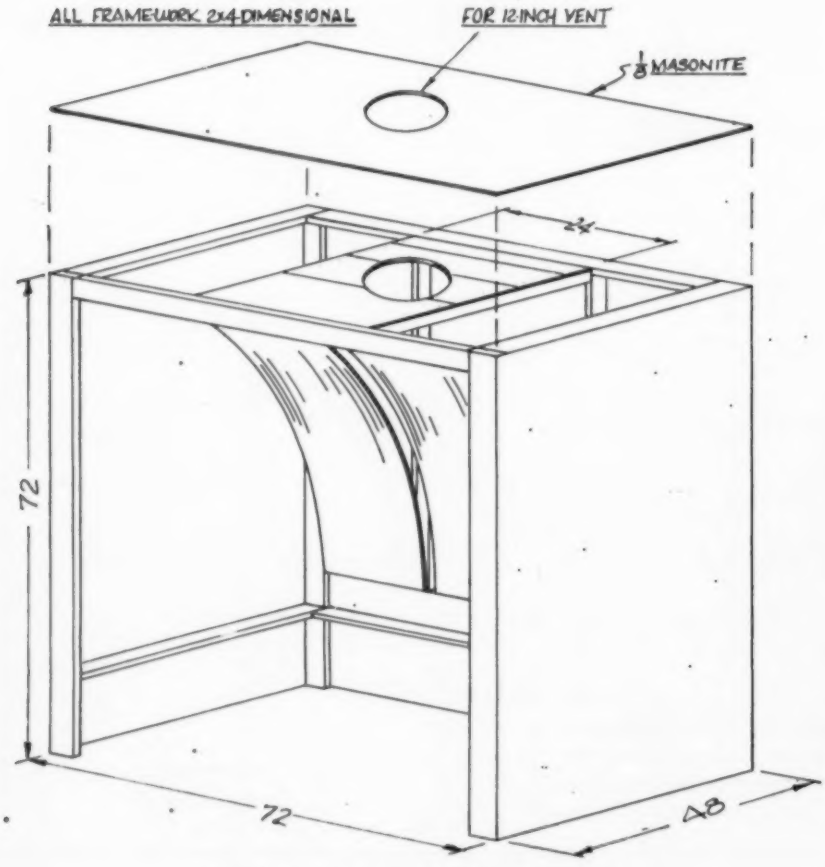
DAVID S. BORTEL
Bowling Green, Ohio

The article entitled, "Shop Ventilation During the Cold Months," written by our



Detail drawing of the bow tie rack by D. L. Garner

Photograph by Robert Coventry. He is shown spraying a project



Details of spray booth by David S. Bortel

editor, John J. Metz, in the January issue, was a timely and worthwhile article.

For some time I have attempted to solve the problem of ventilating the industrial-arts room to remove the fumes resulting from the spraying of lacquer. The cost was prohibitive so the next best thing to do was build a spray booth to take care of the odors and vapors.

The first problem was to draw plans and locate parts. After checking with a plumbing and heating contractor, I purchased a used blower from an old furnace. By taking plywood and closing one end, the other end was enclosed with a plenum made of masonite. A hole was cut in the top of the booth and the plenum placed over the hole.

In order to pick up any fog drifting to the front or edges of the booth and escaping, curved baffle plates were constructed of masonite and spaced one and one half inches apart. The same amount of space was also allowed around the top, sides, and bottom so the vacuum would be more effective.

Two photoflood lights were installed, one in each front corner of the booth to give ample lighting. A Lazy Susan was also made from scrap pipe which solves the problem of handling a project while spraying.

Since cutting a hole through the wall was not feasible at the time, one pane of glass was removed from the window and a piece of masonite put into its place to accommodate the 12-in. vent pipe.

Yes, the booth really works. Before the booth was installed, lacquer fumes could be detected throughout the building. Now, no one knows when we are spraying. The total cost of the booth was $75 saving approximately $225.

THE BUILDING-BLOCK PROJECT

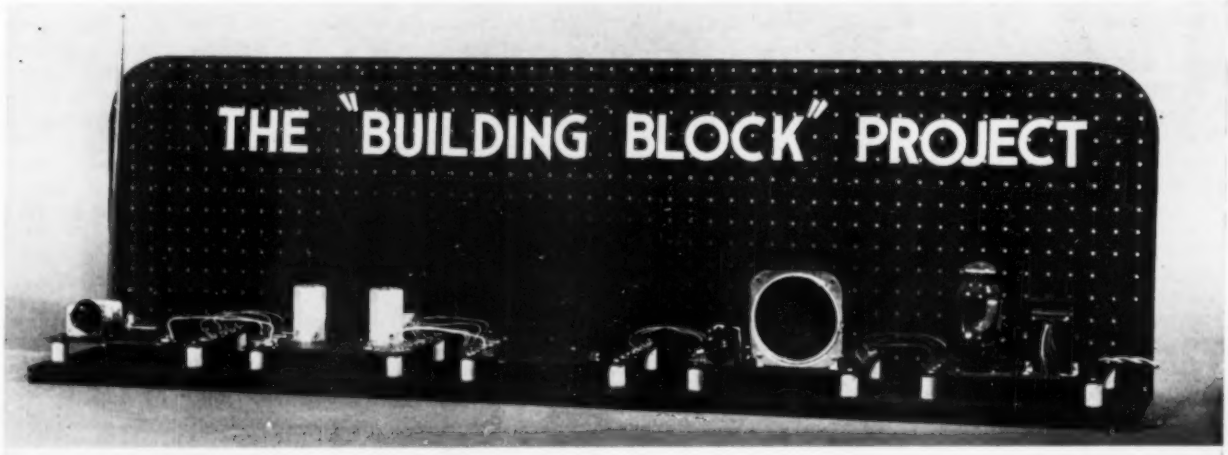
LEROY FRAZIER

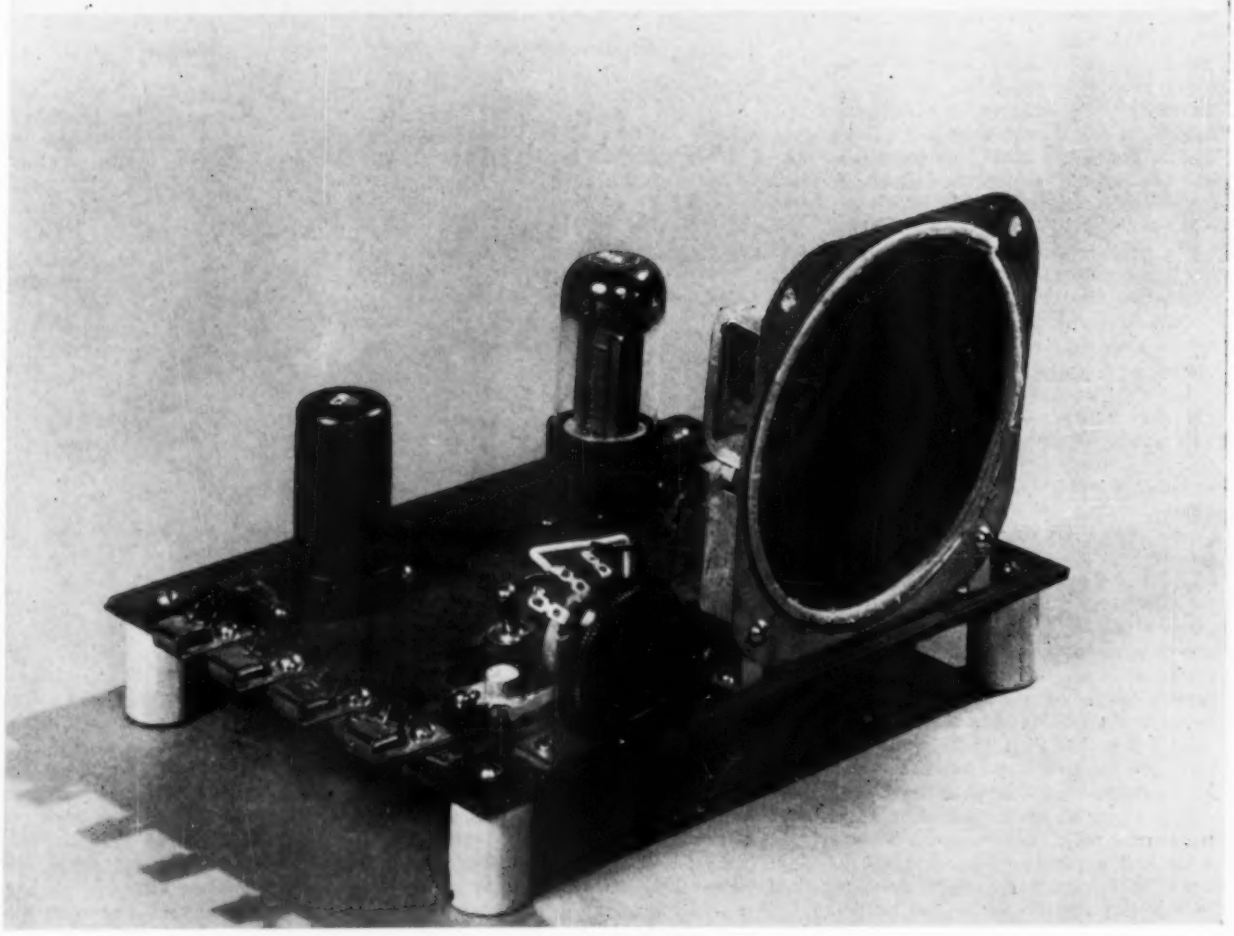
Industrial Education Department
Southern Illinois University
Carbondale, Ill.

The building-block project described herein was developed and constructed as a class project by students in an industrial education course, basic communications. The project was developed with three objectives in view: aid to learning, minimum cost, and adaptability or versatility. The first objective was most important to us; that was its use as an aid to learning. The project does a twofold job here in that it can be used for demonstrational as well as experimental purposes. When used for demonstrations the visible wiring aids the students in seeing and tracing the circuit on the plaque. Since the circuit is not mounted in a cabinet, the plaque needs

only to be turned over to see the wiring on the underside. Also, since the plaques are connected together with hook-up wire and Fahnestock clips, it is easy to disconnect them for demonstrations or storage. In addition to this, the building-block project, as its name implies, follows the block diagram method of instruction which is almost universal today. This has proved helpful for the students because they can match the stages of the project to the stages of the diagram and see what each plaque has to do in the circuit.

On the experimental side, the ease and speed with which these plaques are constructed is important. Also, it is easy to change parts and experiment with different values of resistors and capacitors. It is also an easy and inexpensive way to try out new circuits to see if they will function properly.





The second objective — cost — is easily overcome. Old radios that have a tube missing or will not play for some other reason and which are collecting dust in the attic at home or in the basement of a radio repairman's shop can be disassembled and the parts used in various circuits which in turn are mounted on the plaques. The plaques are made from scrap pegboard with feet made of dowel rods or scrap lumber so there is very little, if any, cost for a chassis.

The third objective was versatility. This stems from the fact that any type of circuit from the most basic to the more advanced types can be built on these plaques and certain circuits or plaques can be put together to form a complete unit such as a radio which is shown in the illustration. In a unit such as radio, the first plaque would naturally be a power supply. The following plaques would contain an R.F. amplifier, detector, A.F. amplifier, and a power amplifier for the output stage. Other circuits which are useful and practical are phono and capacity relays, phonograph amplifiers, and it is even possible to put a complete Hi-Fi set on these plaques. All that has to be done is to break the circuits down into sections such as the pre-amp, tone control, etc., and then mount each section on a plaque. This actually will help the students because they can take each particular section and see clearly for themselves how it is constructed as well as connected to the next section. This is an example of how closely the project follows the block diagram method of instruction and how easy it is for the students to examine each section.

Construction of the plaques is simple and easy. They are made of pegboard and cut approximately six inches wide and eight inches long. The exact size depends on the circuits the plaques are going to hold. However, a uniform or common size makes the project, as a whole, look better than a lot of different sizes. The feet are made of any kind of scrap lumber. They are an inch square, one and a half inches high and are fastened to the pegboard with a single wood screw. Parts are mounted and wired the same as on any other type of chassis except that they are in plain view for the inspection of interested students. Fahnestock clips are used on each end of the plaques so they can be connected together with hookup wire. This provides fast and easy assembly of a unit. These clips generally provide connection for B+, ground, heater voltage, and in the superheterodyne there are clips for automatic volume control (AVC). The antenna for a radio unit can be a loop antenna and/or a whip antenna or an outdoor antenna.

It is advisable, where possible, to use a transformer that is heavy enough to carry a big load without overheating. Since the power supply can be used on different units or complete circuits, the amount of current needed for each unit will vary. For this reason it is best to have a transformer that will meet the demands of different units. Also, for the same reason, a resistor of high wattage rating or a filter choke with a large current rating is an absolute must in the filter section of the power supply.

The building-block project is recommended as a student project because it answers the problem of getting the most knowledge at a minimum of cost; also, because it is simple to construct, easy to use, and creates interest among the students.

CRYSTAL RADIO RECEIVING SET

DONALD EGNER

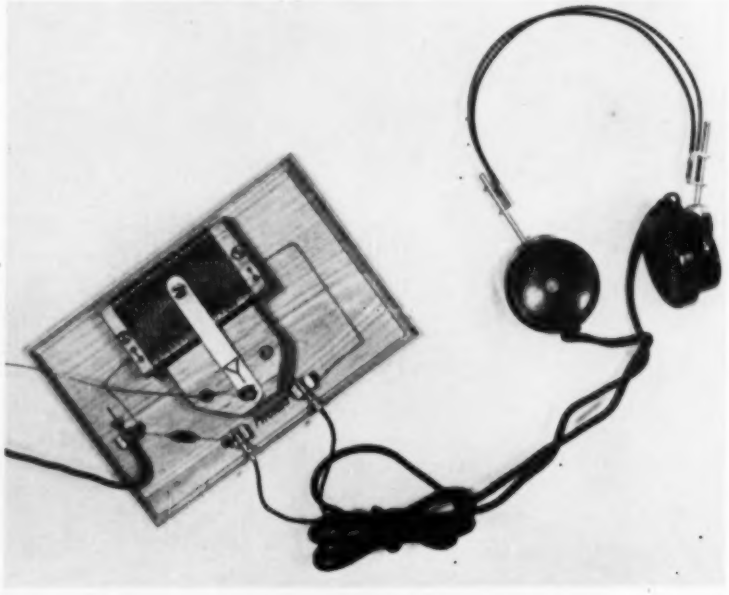
Industrial Arts Teacher
Berwick Area Junior High School
Berwick, Pa.

The new emphasis on science in education is getting a practical application in the junior high industrial-arts program of Berwick, Pa. Correlating the making of crystal radio receiving sets with the general science class, along with a unit of work in the industrial-arts class on the basic theory of transmitting and receiving radio frequency waves has developed much enthusiasm and learning among the students. This interest was further increased when one of the high school boys, a licensed radio ham, gave a demonstration with his transmitter and receiver in the industrial-arts shop.

The crystal set pictured is simple to make, and takes very little time to build. It is made by winding about 125 turns of No. 26 plain enameled wire around a block of wood about ¾ by 1½ in., in size, which is then fastened with wood screws to a base measuring approximately 5½ in. wide by 8 in. long. A fixed crystal diode is then put from one phone clip to the ground connection. One side of the coil is fastened to the ground connection also, while the other end of the coil is secured to the opposite phone clip.

The antenna may range from a few feet of wire stapled around the ceiling corner of a boy's bedroom, to several hundred feet of antenna wire. The size of the antenna depends upon the location of the receiver in respect to the transmitting radio station or stations.

Photograph by Chester Nolte, sheet-metal teacher in the Vocational Department of Berwick Area Joint Senior High School.



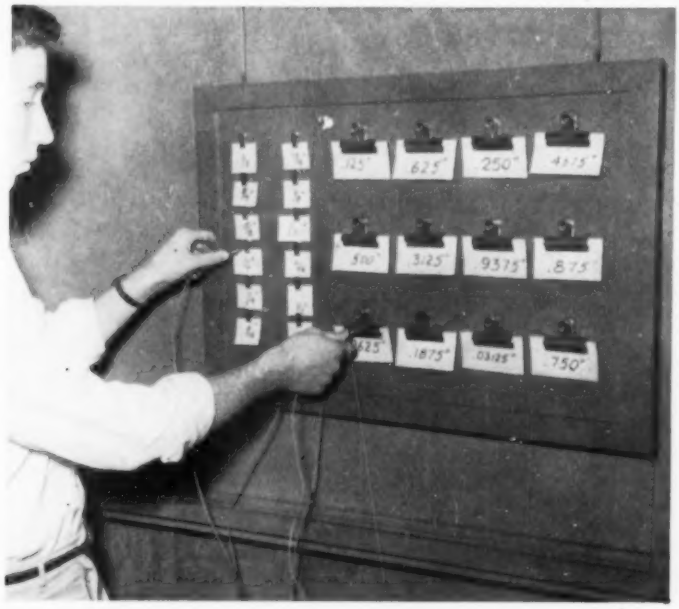
Crystal receiving set

AN ELECTRICAL QUESTION AND ANSWER BOARD

GEORGE W. GENEVRO

T. & I. Department Head and
Machine Shop Instructor,
High School
Modesto, Calif.

The question and answer board shown in the illustration was constructed at the request of my wife when she was teaching on the elementary level. The board was used successfully in a third grade classroom for some time. Finally, I got it back and decided to use it in my machine shop classes to teach decimal equivalents, tool identification, common formulas, machine part identification, and small hardware rec-



The question and answer board in use

ognition. It has performed this service for three years now and students always seem to be interested in trying their luck against test prods and light bulb.

The board is very simple to build. The materials required are given in the bill of materials at the end of the article. Power is supplied by two flashlight cells, but a small door bell transformer may be used if you desire to use a buzzer to indicate correct choices.

Wiring the board consists of connecting the question to the proper answer with a small gauge wire. The *question* test prod is connected to the minus side of the battery and the wire from the plus side of the battery leads to the bulb. The other wire from the bulb leads to the *answer* test prod.

The chief advantage of having such a device in the shop is that students with a few minutes to spare usually find their way to the board and try their luck. A certain amount of informal learning is bound to result.

BILL OF MATERIALS

Amount Required	*Material*
18 by 28 in.	¼ or ⅜ plywood
9 ft.	¾ by 1¾ pine trim
30 ft.	Bell wire or No. 18 standard wire
30 ea.	Soldering lugs
30 ea.	6-32 machine screws — ¾ in. long
12 ea.	Esterbrook ball bearing clip — 2 in. wide
12 ea.	Esterbrook ball bearing clip — 1 in. wide
1 ea.	Flashlite bulb and socket

METHOD OF ATTACHING THE SOCKET TO THE LAMP

GORDON K. GOTTLIEB
Long Island City, N. Y.

For many years a project much favored by the industrial-arts students has been that of making an electric lamp of one type or another. Electric lamps are always useful and seem to appeal to both boys and girls. I believe it is safe to venture a guess that they will continue to remain a popular choice of the students.

There is no need to review the steps involved in the execution of this project. The idea I have hit upon is a means of curtailing the cost which should prove helpful.

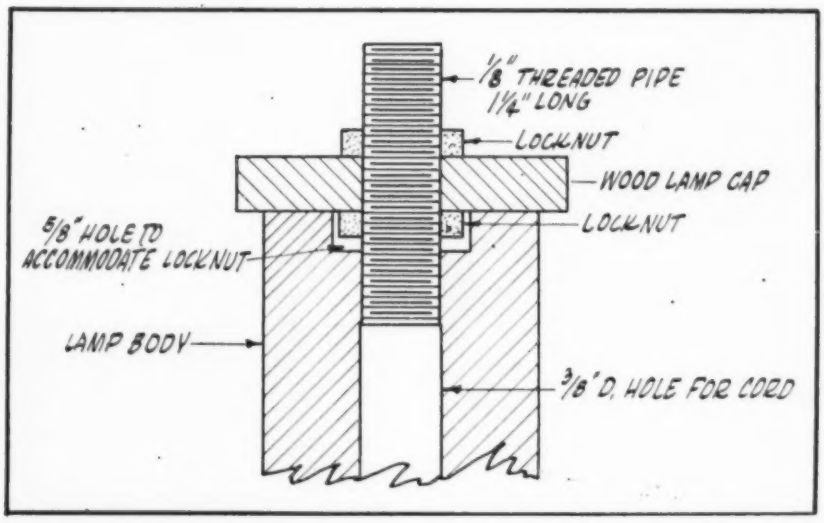
This suggestion is related to the means of attaching the socket to the lamp. To achieve this connection a satisfactory method has been devised which is in general use in most shops. This is to use a length of threaded pipe or tubing which extends from the socket to the base of the lamp. This pipe is then bolted with a lock nut at the base and at the socket, securing all parts of the lamp as a solid unit. The undesirable feature of this system is the high cost of the threaded pipe which is used.

Lamp standards are often 12 in. high and they are getting taller as the modern furniture gets lower. Thus, it is easy to see how many, many feet of pipe would be required for all the lamps the pupils seem determined to make. Most instructors are interested in keeping shop expenses down and I am no exception. With this in mind I experimented and found a way to economize.

The connection between socket and lamp base can be accomplished in a perfectly satisfactory way with the use of only a 1¼-in. length of threaded pipe. This is done by using the cap on the top of the lamp as shown in the sketch.

The 1¼ in. of threaded pipe is then fastened to the cap with a lock nut above and below, as shown. The top of the hole in the lamp upright itself must be enlarged to accommodate the nut. Then the cap is nailed and glued, or simply glued to the upright. With this method it is possible to make a very strong lamp while using a minimum of threaded pipe.

Another advantage of this method is



Method of attaching lamp socket firmly to an electric lamp

that the center hole of the lamp need not be perfectly straight. When using a full length of threaded pipe the hole must be straight enough for the pipe to pass through it. With the cap method it is only essential that the hole be continuous. This gives the lamp maker greater freedom in designing the base.

SIMPLE JIG FOR OBTAINING ACCURATE CURVES

PETER T. McKINNEY

Chicago, Ill.

Making smooth uniform curves, bends, or circles in rod or flat stock is a problem frequently faced in vocational and industrial education classes. The easiest way to solve this is to make a bending jig out of scrap pipe, as described in this article. The jig shown in Figure 1 makes it possible to consistently make uniform scroll-shaped parts from rod or strap iron. The resulting shapes can be used as parts of furniture, as wall decorations, as functional parts of welded projects. The production of this jig could be a challenging project to advanced students in many vocational classes.

To make this bending jig you need scrap or new pipe of various diameters. In Figure 2 are pipes 4½, 2¾, 1⅞, and 1⅛ in. outside diameter that are later welded together to form a single unit. Braze-welded to each pipe is a *hold-down* lug made from a 3½-in. long section of ⅛ by ¾ by ¾-in. stock. This lug may be made from shapes other than the "T" and be equally as effective. Figure 3 shows the location of the lug on the pipes. Note that the clearance under the lug takes care of ¼-in. rod or smaller. When round or flat stock thinner than ¼ in. is to be formed a metal shim to fill up the space under the hold-down lug should be used.

The four pipe sections shown in Figure 4 can be used separately for bending or they can be welded into a compact assembly. To make this assembly, slip the smallest pipe into the next largest and weld it in place at each end, bracing the ends solidly with scrap material. Then insert this assembly into the next largest pipe and repeat the operation. The same thing is done when you insert and weld the assembly into the largest pipe. Weld an angle on the base of the largest pipe so the assembly can be held in a vise while bending is performed.

All the material being bent in the jigs shown is cold. Note that the bending jig is held in a bench vise on a sturdy table. Figures 5 and 6 show how different scrolls can be formed at opposite sides of a piece of material. In Figure 7 scrap pipe for the largest jig is being marked for trimming. A string is tied around the pipe where the cut is to be made so that the soapstone mark will be accurate.

Flame cutting the 3/16-in. wall pipe in Figure 8 is quickly accomplished by using a blowpipe with a No. 3 cutting nozzle. The smooth cut shows in Figure 9 where the blowpipe is being used to braze weld the lug to the pipe. If scrap pipe is used care must be taken to clean off the rust in the area that will be welded.

Using a No. 6 tip and a ⅛-in. Oxweld

GUN HOLSTER

This holster was made to fit an H & R target revolver. The same type of holster can be made to fit almost any hand gun. A fairly good grade of cowhide is necessary, but it need not be tooling leather for this one is stamped. Cut a pattern out of soft cardboard.

1. Bend cardboard, A, around the gun and place it on a flat surface.
2. Pinch together at X and Y and mark on back and front.
3. Hold down gun, open up paper, and draw outline around gun, allowing about ½ inch for clearance and lacing.
4. Cut out along this line from X to Y on bottom half.
5. Fold paper so X and X and Y and Y meet, and mark the other half.
6. Add the belt flap and the concha piece below.
7. Make sure pattern fits gun. Lay pattern on cowhide, mark, and cut. Use a sharp knife.
8. Fold leather around gun to determine outline for stamping.
9. Moisten leather and stamp the design on it. Let it dry.
10. Fold belt loop back and determine where lock strap should be placed.
11. Lace lock strap to belt flap, B.
12. Place gun in holster to locate snaps.
13. Punch holes for belt loop and lace it to back of holster as at B.
14. Bring edges together and cement and clamp until cement has set.
15. Punch lacing slots and lace with simple overcast or as shown on billfold instructions.
16. Finish with several applications of brown shoe polish.

Concha can be made of silver or aluminum.

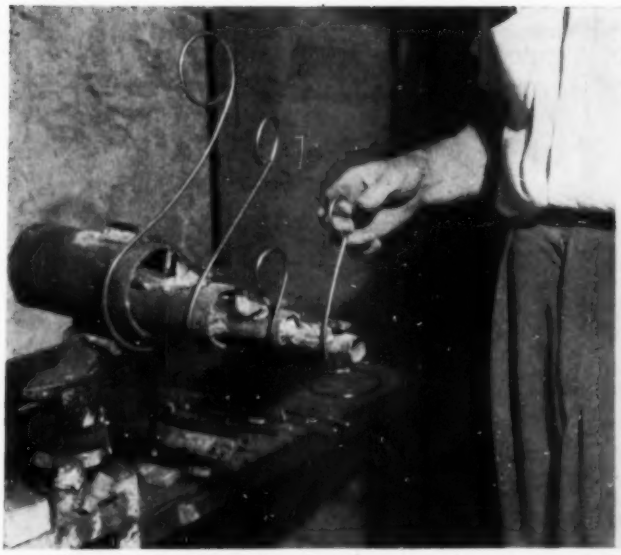
About ½"

Grain Side

File stamps out of heads of spikes or buy them at a leather store.

This punch can also be made out of a large spike.

Ben Hunt, Hales Corners, Wis.



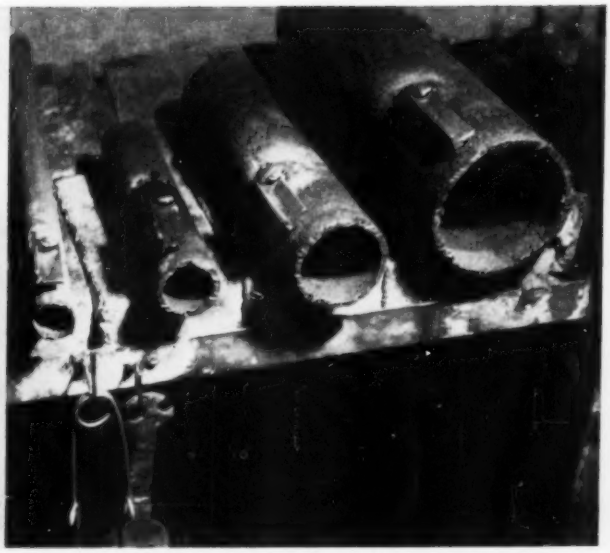


Fig. 1. Jig for making scrolls of various sizes using ¼-in. rods. Fig. 2 (at right). Pipes of various sizes to be welded together for a jig

Fig. 5 (at right). Forming bend on largest pipe. Fig. 6. Forming reverse bend on opposite end

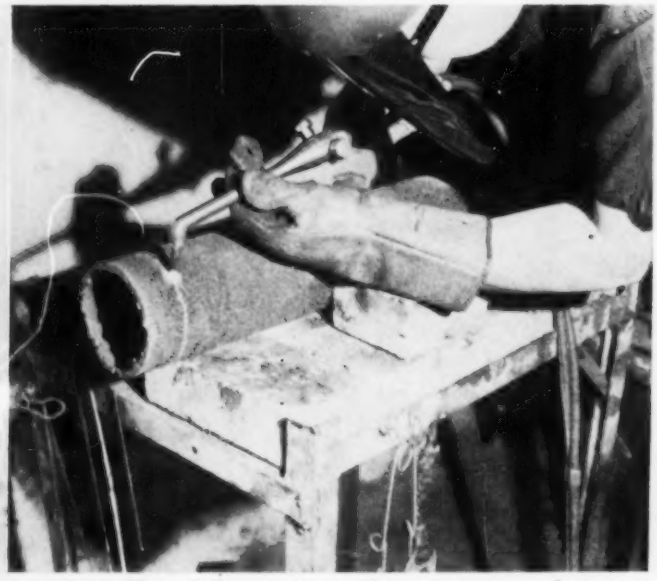
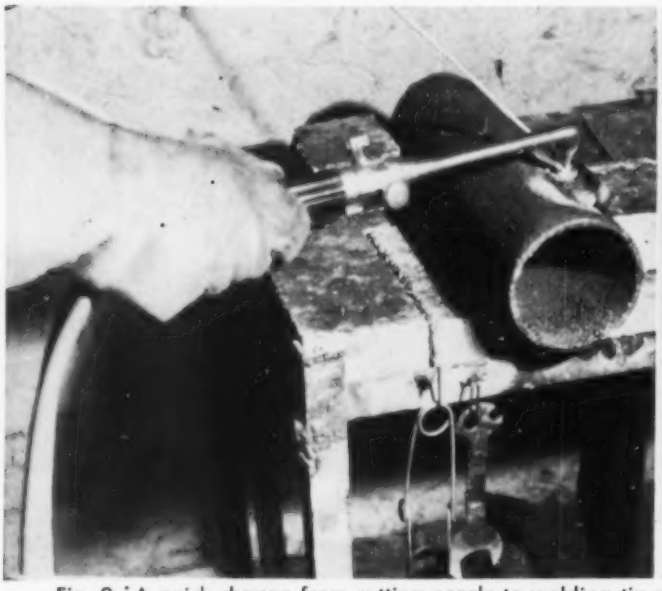


Fig. 7. For flame cutting, tie a string tightly around pipe. Then follow string with soapstone marker. Fig. 8 (at right). Heavy pipe can be flame cut readily by using a No. 420 Prest-O-Lite blowpipe



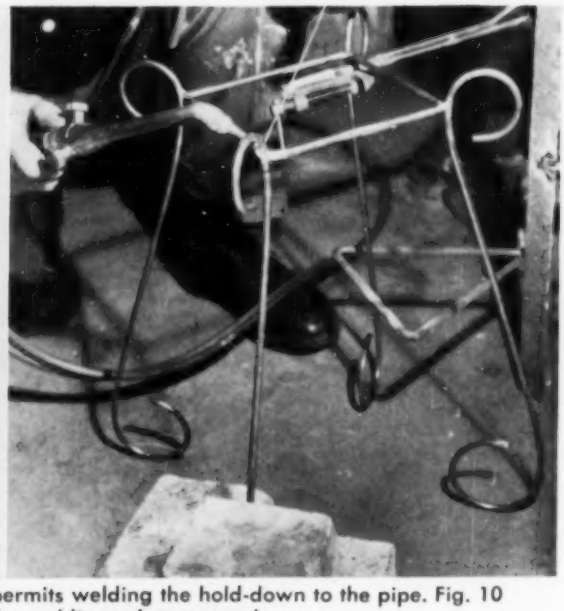


Fig. 9. A quick change from cutting nozzle to welding tip permits welding the hold-down to the pipe. Fig. 10 (at right). No. 2 welding tip is used for welding ash-tray stand

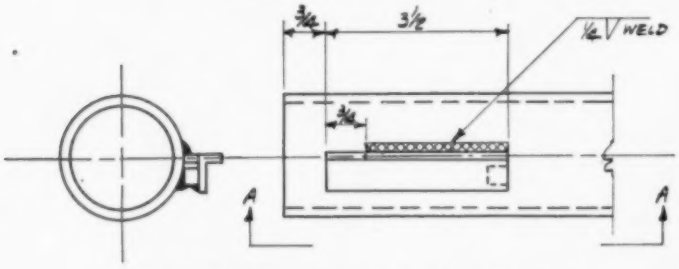


Fig. 3. Hold-downs welded to the pipe

Fig. 4. Braces welded between pipe sections

flux-coated 25M bronze rod, the "T's" were welded in two passes. Note in Figure 3 that a steel brace is welded at one end of the lug. This gives extra strength to the lug which undergoes severe strain when bending is performed.

As a demonstration of the utility of the bending jig a "Victorian" style ash-tray stand was made almost completely from scrolls bent on the jig. Figure 10 shows the four scroll-shaped legs being fusion-welded to the square that will hold the tray. Figure 11 shows the completed stand. There are 30 scroll bends in the stand all made with ease in ¼-, 5/16-, and ⅛-in. rod. The lower shelf of the stand is made

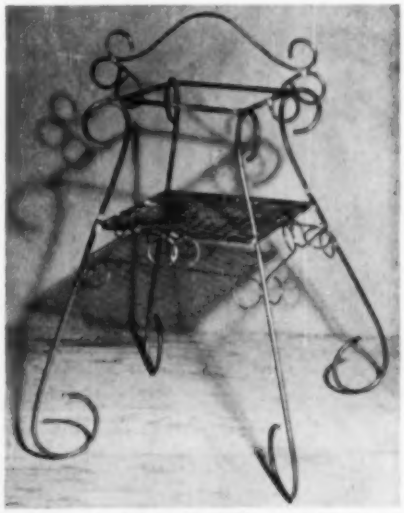


Fig. 11. All rods on this Victorian style stand were formed on the bending jig described here

from perforated sheet metal that is braze-welded to an 8-in. square of ¼-in. rod with tack welds spaced 1½ in. apart.

Before they were bent the legs of the stand were 30 in. long. The bend at the base was done on the largest diameter in the jig, the bend at top was made on the 2¼-in. pipe.

AN IMPROVED TECHNIQUE FOR DIPLOMA IMPRINTING

DAVID CARL GOLDSTEIN
Teacher of Printing
Alice Deal Junior High School
Washington, D. C.

If in your school print shop you are responsible for printing the names of the

graduates on your school diplomas, or if you do any type of work that involves the running off of individual imprints (one or more copies of each), here is a technique that will enable you to do it quickly and with a minimum of effort. Its main advantage lies in that you do not have to unlock the type form or even remove the chase from the bed of the press.

From the school woodworking department obtain two small friction catches of the ball bearing type. NOTE: hardware stores usually carry these friction catches.

Now, in the side of a block of wood furniture drill two holes exactly five picas each way off center (ten picas apart), slightly smaller than the diameter of the catches.

You will find that it is easier to do this drilling yourself than to impose on the woodshop teacher and then find yourself tied up for over an hour explaining the purpose of the point system and defending its utility as compared to the English or of the metric system of measurement.

Insert the catches. Lock the form so that the catches press against the furniture top and bottom of the type line. See that the type is secured just tightly enough so that it will not fall out. If you use linotype or ludlow slugs the work will progress more easily. If desired the slugs can be changed without even removing the chase from the press.

FORMICA HOT PLATE — BEGINNING PROJECT FOR SEVENTH-GRADE PUPILS

DENHAM R. GRIFFIN
Nichols Junior High School
Mount Vernon, N. Y.

BILL OF MATERIALS

No. of Pcs.	*Material*	*Size*
1	Softwood	½ by 8 by 8 in.
1	Formica	8 in. dia.
1	Felt	8 in. dia.
	Abrasive paper	1/0 and 3/0
	Stain	
	Shellac	
	Varnish	
	Contact cement	
	Glue	

Tools and Machines

Dividers, jig saw, file, rule, plane, scissors, pencil, try square, and brush.

Procedure

1. Select a piece of softwood approximately ½ by 8 by 8 in.

2. Draw diagonal lines from corner to corner with rule and pencil.

3. Use the intersection of the lines as a center from which to swing a circle with a radius of 4 in., with the dividers.

4. Step off the radius around the circumference of the circle, to divide into six even parts. Do this so that two edges of the stock will be parallel to the grain of the wood. This will make later planing easier.

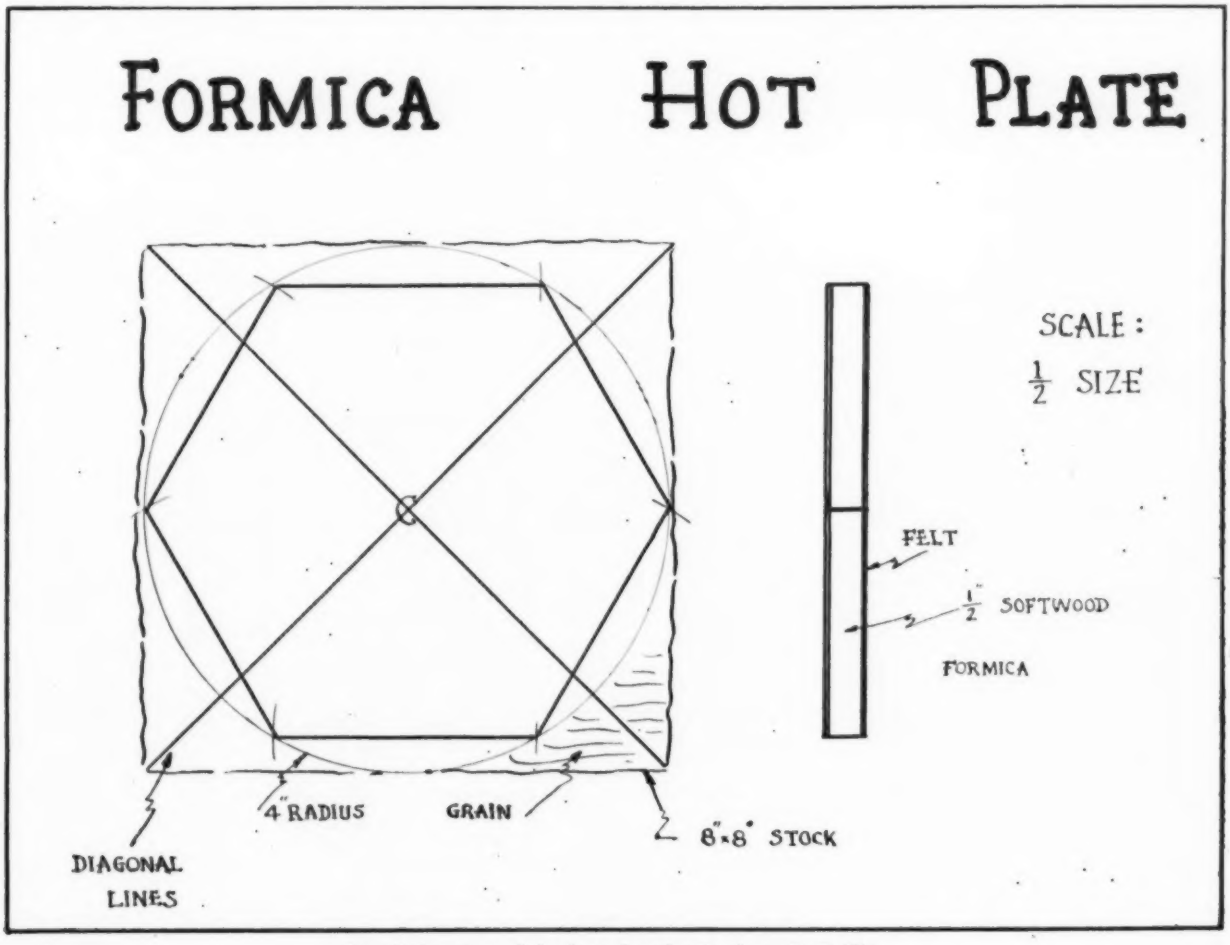
5. Cut out on the jig saw. Leave approximately 1/16 in. from line for planing.

6. Plane to lines. CAUTION: Plane away from edge grain first, always toward the end grain to prevent splitting. Plane edges last.

7. Trace on a piece of formica. Use close to corners to save extra cutting and material.

8. Cut on jig saw, finished surface up. Use a fine blade, cut slowly, keep hold-down foot as tight as possible. Allow 1/16 in. extra for filing.

9. Apply contact cement to both sur-



Detail drawing of the hot plate by Denham R. Griffin

faces. Follow the directions on the can as different manufacturers vary procedure slightly.

10. When dry lower wood on formica. Take care to place on straight as once contact is made, it cannot be broken. Paper between the surfaces may be used for alignment and then withdrawn slowly.

11. Turn over. Rub hard from the center outward. A rolling pin may be used or hand pressure.

12. Place in vise with a protective piece of wood on the formica side.

13. File one edge at a time. File from formica to wood. This may be done immediately after cementing.

14. Sand with 1/0 abrasive paper. Sand edges only.

15. Smooth with 3/0 abrasive paper.

16. Stain edges to match or blend with formica. Let dry overnight.

17. Shellac. Let dry overnight.

18. Sand with 3/0 abrasive paper.

19. Repeat steps 17, 18.

20. Varnish. Let dry overnight.

21. Glue felt to base.

22. Trim with scissors after glue is dry.

NOTE: Formica offered special school kits a few years ago. Probably this offer is still in force.—*Author.*

MASKING TAPE DISPENSER

JAMES W. FREEMAN
Draftsman
Franklin High School
Cedar Rapids, Iowa

An item of expense in most drafting rooms is masking tape, especially when it is cut with a scissor or torn to length. It is difficult for the student to obtain the necessary pieces of tape for hold-down purposes without wasting it.

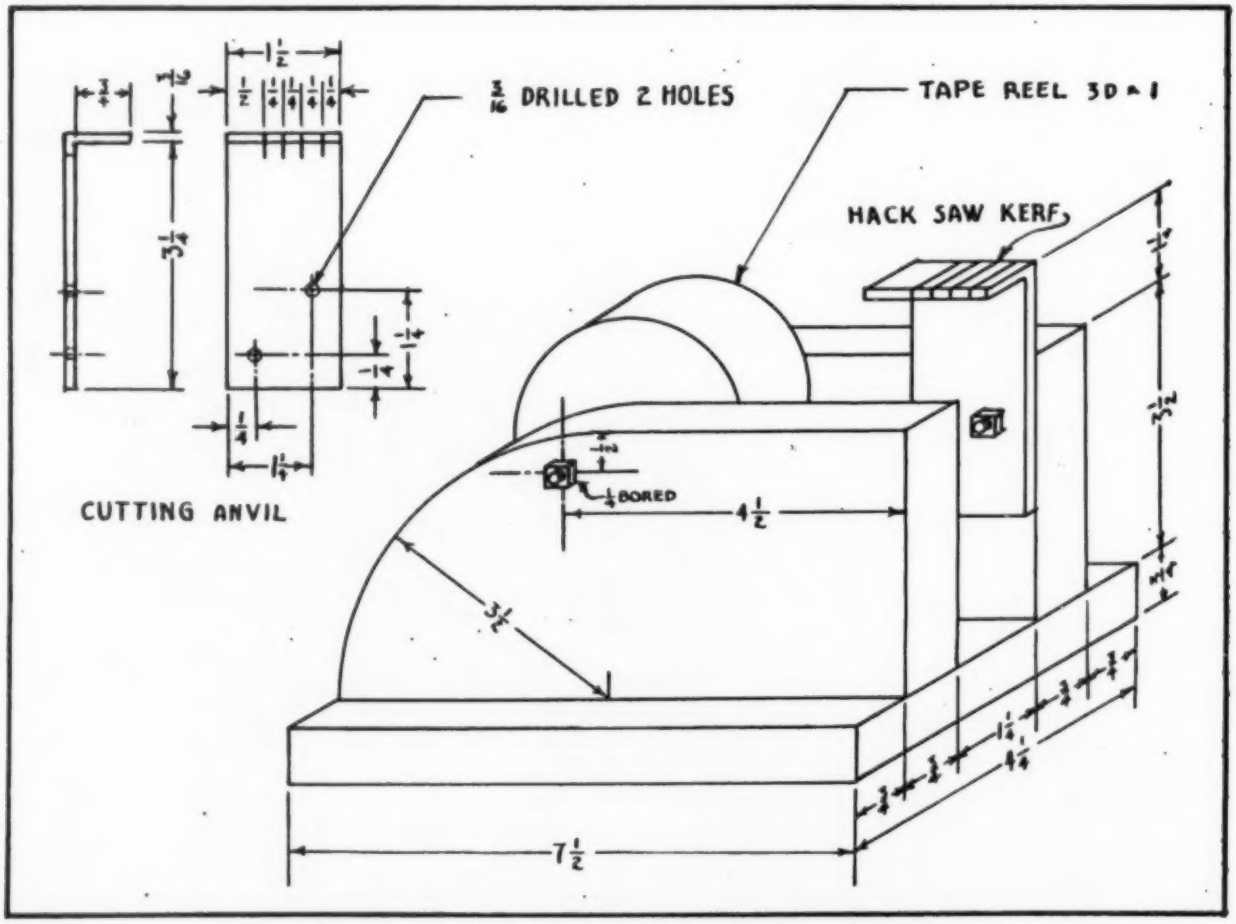
Our tape requirement at Franklin High in Cedar Rapids, Iowa, was reduced by almost one-third by using the simple tape dispenser shown below. A few minutes work in a general shop will provide one for your drafting room.

Use ¾-in. wood stock for the body of the dispenser. Cut a tape reel of 1-in. wood stock, on the band saw. In making the cutting anvil, bend the 5/16 by 1½ stock by clamping it in a vise so that ¾ in. is held in the vise. Bend cold to 90 deg. Lay off the ¼-in. marks on the ¾ in. flat surface and saw with a hack saw. The kerfs will serve as blade guides when cutting the tape. Load the tape reel with 1 inch masking tape.

In using the tape dispenser, pull off tape from the reel and stick lightly on the ¾-in. flat surface of the cutting anvil. Be sure that the end of the tape is even with the end of the anvil and that about ¼-in. of the tape extends over the edge away from the bend. This method reveals the kerfs so that the razor blade or knife used to cut the tape is easily started and the cuts made. After cutting the four strips, all four pieces can be removed at once by grasping the ¼-in. edge which was not stuck down.

We found that both tape and time were saved by using this dispenser. It is not difficult for students to use and they get four pieces of tape in a hurry. All are the same size and the waste is minimized.

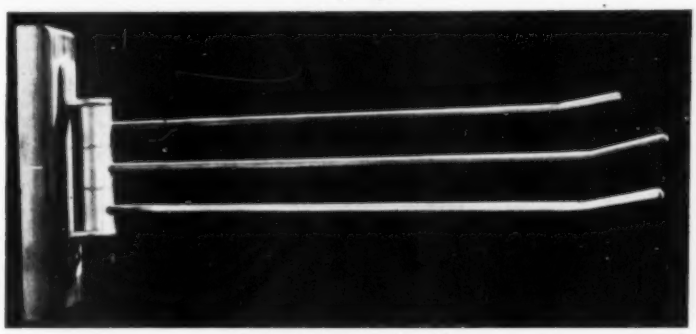
A small scratch in a wood finish can be obscured by rubbing with the meat of a pecan nut. Coat it carefully with fine-pointed camel's hair brush with some pure, white shellac that has been thinned and is fresh.—*Shellac Information.*



Detail drawing of the masking tape dispenser by James W. Freeman

A HANDY SWINGING TOWEL RACK

GEORGE W. GENEVRO
Department Head and Machine Shop Instructor
Modesto, Calif.



Swinging towel rack

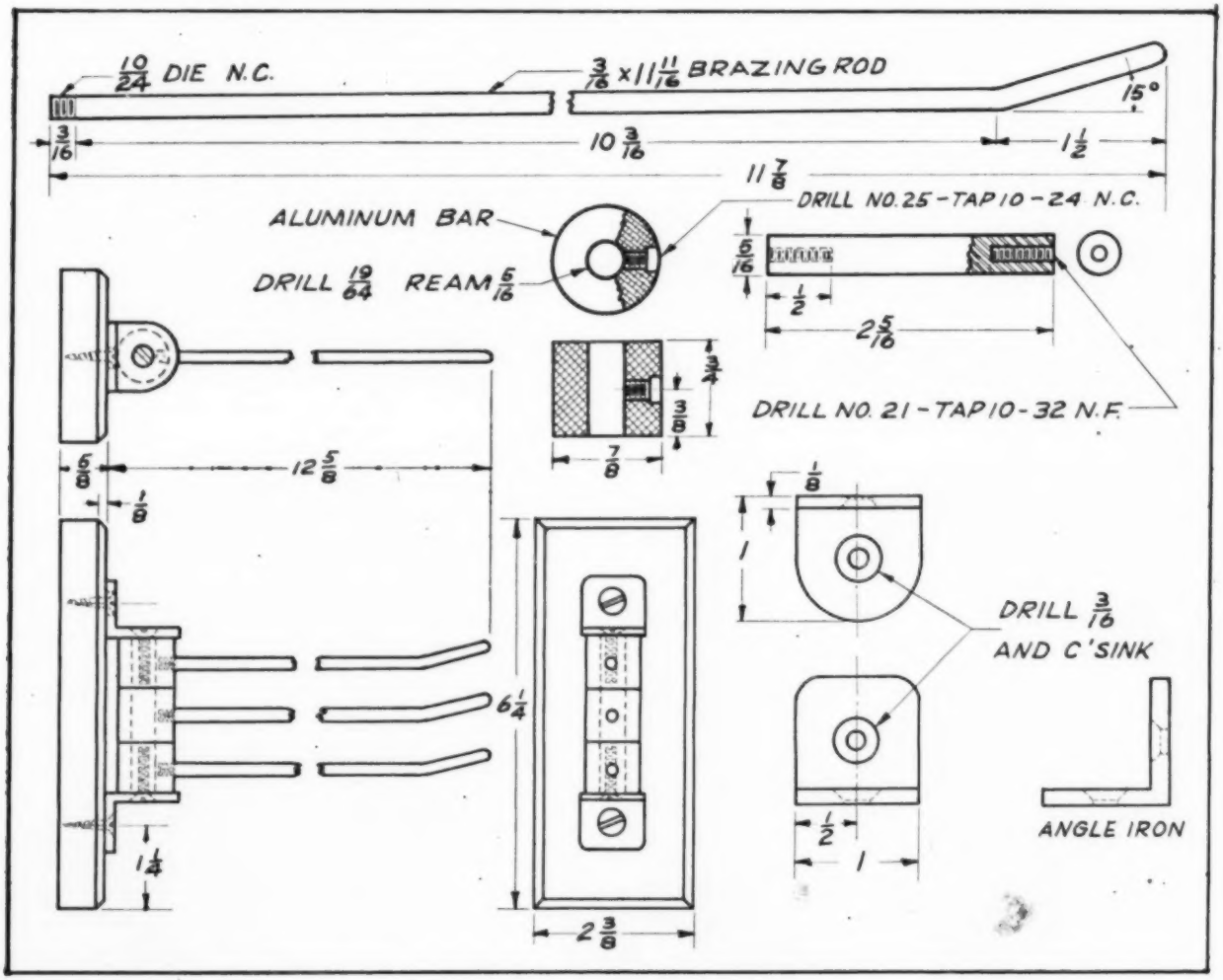
This project has been popular with both beginning and advanced machine-shop students. It is useful and any student likes to take home a project that will be used in the home. The appearance of the finished object is eye catching, especially the contrast between the polished aluminum and brass parts. The use of chrome-plated screws to hold the parts together and to attach it to the mounting board will improve the appearance.

The towel rack is made of aluminum and brass, as specified, with the exception of the shaft on which the hubs pivot. This is made of cold rolled steel but $\frac{5}{16}$-in. round brass rod may be substituted. For the angle brackets both aluminum and steel angle of the size specified were used but the use of aluminum angle is preferred.

In order to conceal the thread on the brass rod where it enters the aluminum hub, the threads in the hub were counterbored $\frac{3}{32}$ in. with a $\frac{5}{16}$-in. drill. This operation hides the incomplete thread left by the 10-24 die. All other operations are in line with standard machine-shop practice. A coat of clear metal lacquer will help to preserve the finish.

This project involves a fairly large variety of hand and machine operations as well as giving the student a chance to work with nonferrous metals.

Nearly two million persons a year are hurt in work accidents. — *National Safety Council.*



Details of swinging towel rack

ALIGNING A SUPERHETERODYNE RECEIVER

CHARLES F. GREEN and
MICHAEL FICHERA
Middlesex County Vocational and
Technical High School
New Brunswick, N. J.

Objective: To learn how to align a superheterodyne receiver. (Insert alignment diagram for receiver.)

Procedure: Step A — Checking audio section. (Use diagram.)

1. Inject an audio signal between the high side of the volume control and common ground.

2. Connect 'scope from center tap of volume control to common ground. Adjust volume control to get five divisions on the 'scope without distortion (Fig. 1).

3. Connect 'scope across the speaker and note the approximately 35 divisions on the 'scope, a gain of seven (Fig. 2). It is assumed the audio portion is working now.

Step B — Aligning 2nd I.F. amplifier. (Use diagram.)

1. Ground the A.V.C. Buss with a jumper.

2. Inject modulated 455 KC from signal generator between the control grid of the I.F. amplifier and ground.

3. Connect vertical input of 'scope to voice coil connections on the speaker (Fig. 3).

4. Adjust tuning slugs of 2nd I.F. transformer for maximum gain (Fig. 4).

Step C — Adjusting 1st I.F. stage. (Use diagram.)

1. Inject modulated 455 KC between control grid of mixer tube and ground.

2. Connect 'scope across speaker.

3. Adjust slugs of 1st I.F. transformer to maximum input (Fig. 5).

Step D — Adjusting the oscillator. (Use diagram.)

1. Set dial on radio to 1400 KC.

2. Set signal generator to 1400 KC.

3. Connect 'scope across speaker.

4. Inject 1400 KC modulated on antenna.

5. Adjust oscillator trimmer for maximun gain. Figure 6.

Step E — Adjusting trimmer in grid circuit of mixer stage. (Use diagram.)

1. Repeat steps 1 through 4 of step 4.

2. Adjust variable trimmer in grid to give maximum gain (Fig. 7).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

CONCRETE BICYCLE RACK — A PRACTICAL MASONRY PROJECT

GENE CARTWRIGHT
Industrial Arts Instructor
Blair High School
Blair, Wis.

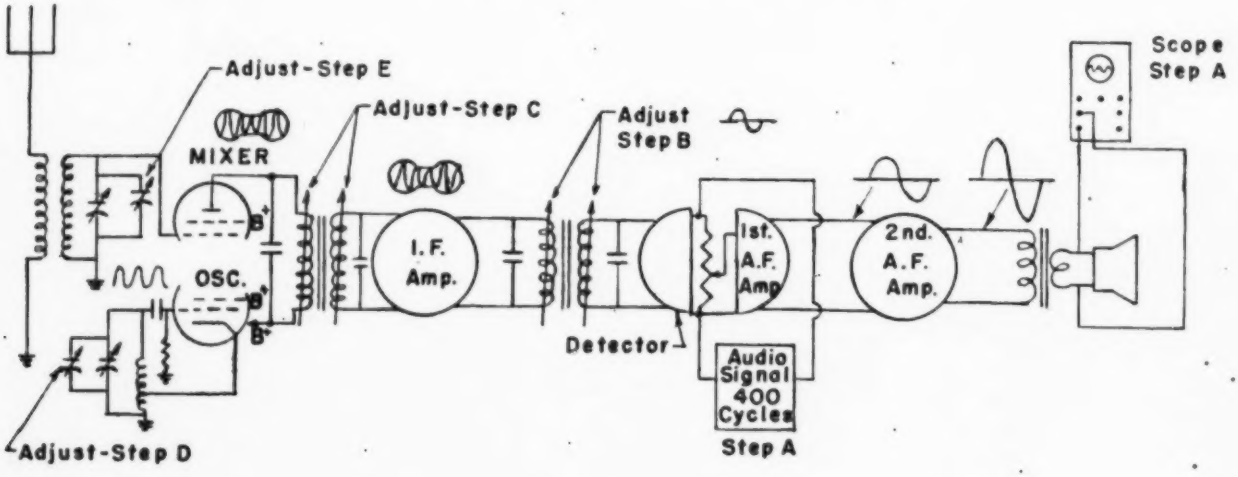
A number of secondary schools and colleges now offer at least a brief unit in some phase of masonry. Additional schools can benefit from such a unit because the necessary techniques and materials are simple and integrate smoothly with such units as carpentry, bricklaying, drawing, and even woodworking, all of which are now commonly offered.

However, it is often difficult to develop a masonry project which trains students in such important skills as form building, cement pouring, and finishing. In addition, many such projects are then of a size or nature that they cannot be taken home and used by the student who has made them.

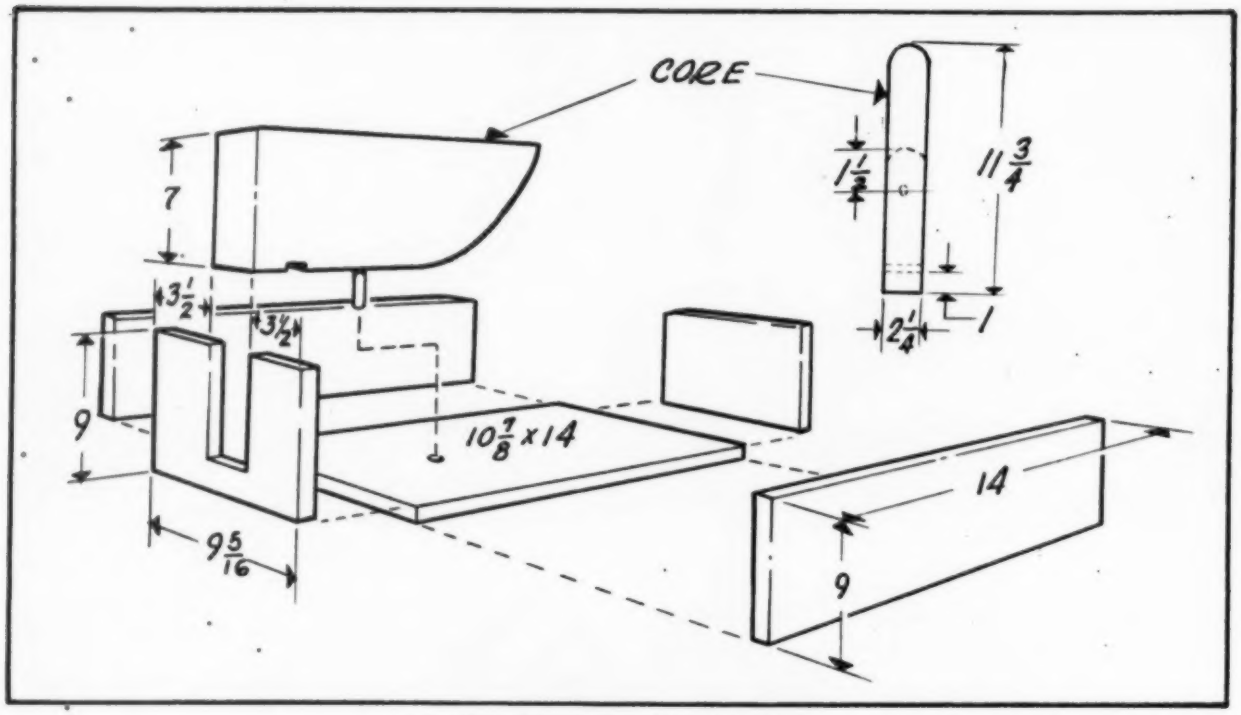
Fig. 7

The bicycle rack described in this article has a number of advantages as a project. It is a good medium through which to teach design and planning. In those stages the student need not follow this project step by step, but rather should regard it as a "guide to design" and plan a rack to meet his own specifications or preferences.

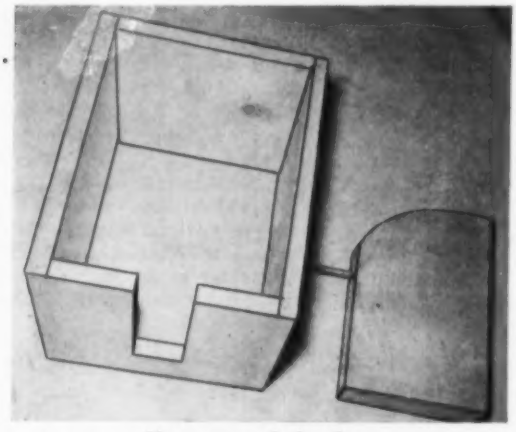
Because all bicycle wheels are not of the same width and circumference, student planning is a "must." For instance, a student can also work the project into a dual bicycle rack simply by doubling the size of the form in length so that a bicycle may enter the rack from either end. Strength and appearance should also be emphasized.



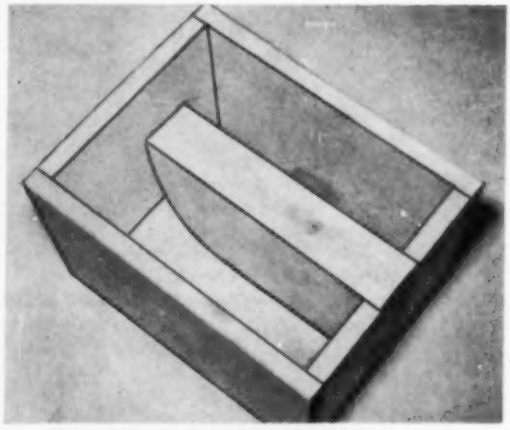
ALIGNMENT DIAGRAM FOR SUPERHETERODYNE RECEIVER



Form for concrete bicycle rack



The parts of the form



The form set up for pouring

Finally the project is feasible because of its very low cost and minimum of required equipment in contrast to its unusual educational advantages.

Making the Form

1. Select stock.
2. Work stock to desired dimensions.
3. Glue up stock if necessary.
4. Cut groove in one end for well block rest.
5. Dado well block.
6. Drill for dowel.
7. Assemble (nails or screws).
8. Sand.

Pouring Procedure

1. Lubricate form (heavy auto grease).
2. Cut reinforcements 4 by 6-in. pieces of chicken wire.
3. Mix concrete 3 parts sand to one of cement.
4. Pour cement, inserting reinforcement where needed.
5. Let dry and then remove wood form.
6. Finish rack applying very thin coat of concrete mixture with paint brush.
7. Paint with masonry paint if desired.

Total time lost from work accidents is about 230 million man-days — equal to the year-long shutdown of a plant employing nearly a million workers. — *National Safety Council.*

DRILL VISE INSERTS

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

Material Required:

4-in. Vise — ⅜ by 1¼ by 4⅛ in.
6-in. Vise — ⅜ by 2 by 6⅛ in.

Procedure: Square the pieces to size. Lay out for cutout and location of holes. Cut out the sections with hack saw slightly away from layout and dress to the line with a file, or cut to the layout by milling or shaping. Center punch and tap drill the

Bicycle rack in use

holes, then tap. Mill or shape the seat of the damaged vise to receive the insert. Spot drill the seat recess from the insert plate. Drill body holes for the screws at these spot-drill locations. Turn over the vise and counter-drill for the head of fillister head screws, to hold the inserts in place. For future insert replacements the body holes may be used for spot-drilling location of tapped holes in the insert piece.

Explanation: Most school shops experience the problem of controlling possible damage to equipment by the learning student. There is bound to be carelessness, especially at the drill press, by the student who does not think of the damage a drill point can do when it has gone through the piece of drilled stock. No matter how much the instructor has cautioned about using supporting strips, it will happen. Every drill vise in a school shop, yes, even in industrial shops, will prove this statement.

There is no point in replacing the damaged expensive vise, or allowing it to be used term after term as an invitation for more carelessness. Replacement inserts will preserve the use of the vise and necessitates only a little time to make the change. It makes a good maintenance job for a second year shop boy.

WINDSHIELD SCRAPER — BEGINNING PROJECT FOR SEVENTH-GRADE PUPILS

DENHAM R. GRIFFIN
Nichols Junior High School
Mount Vernon, N. Y.

BILL OF MATERIALS

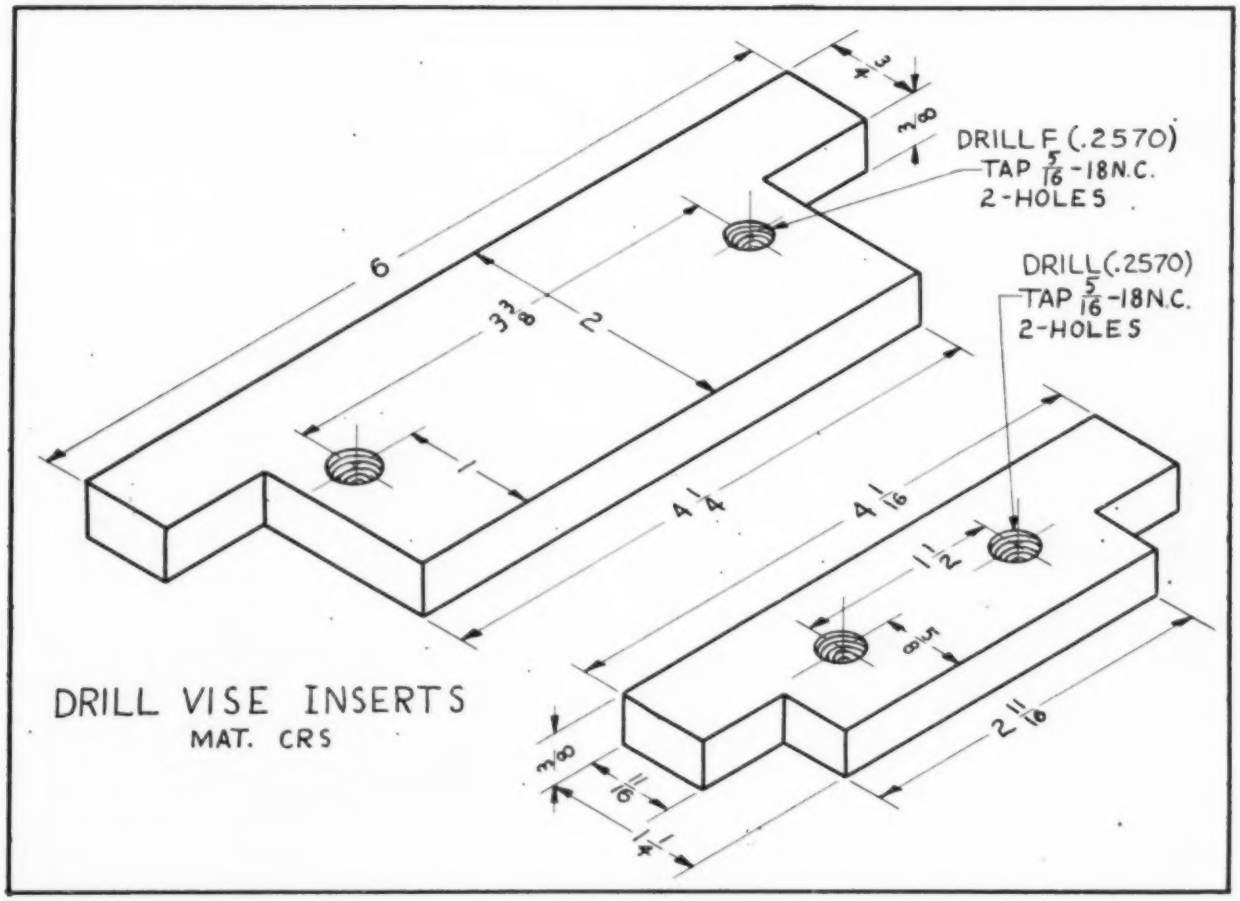
No. of Pcs.	*Material*	*Size*
1	Softwood	¾ by 1½ by 3½ in.
1	Plexiglas or Lucite	¼ by 1½ by 3½ in.
2	Brads	No. 16 by ⅝ in.
	Abrasive paper	1/0
	Abrasive paper	3/0
	Silicon carbide	No. 400
	Stain	
	Shellac	Linseed oil
	Varnish	Steel wool

Tools and Machines

Rule, knife, marking gauge, miter box, buffer, hammer, scriber, sandpaper block, drill press, nail set, band saw, try square, plane, file, drill, circular saw, pencil, and brush.

Procedure

1. Stock is rough cut approximately 2¼ by 4¼ in., grooved on circular saw by the instructor. Groove should be cut so the plastic fits snugly but not tight.



Details of drill vise inserts

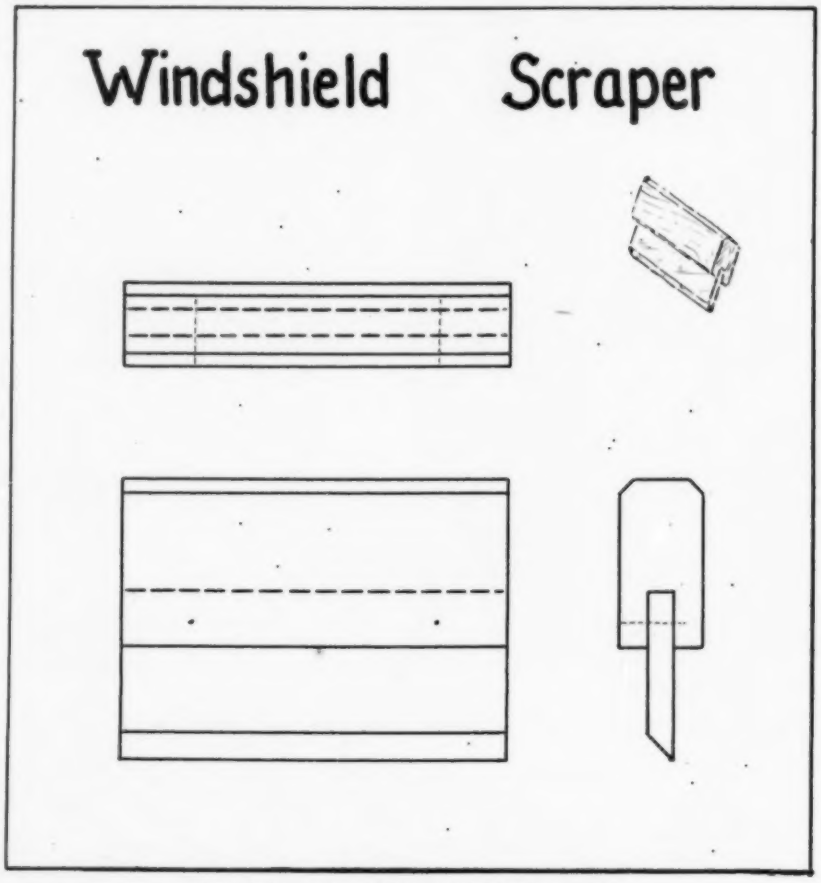
2. Plane grooved edge. Pupil should be cautioned in placing stock in vise so as not to crack grooved edge.
3. Check with try square.
4. Mark width with marking gauge. Fill in line with pencil.
5. Chamfer waste edge.
6. Plane end toward waste edge.
7. Check with try square.
8. Measure length with rule, mark with knife, and square with try square.
9. Cut to length on miter box.
10. Plane second edge to line. Caution pupil again in placing stock in vise.
11. Check with try square.
12. Use marking gauge and mark ⅛-in. lines on edge and faces.
13. Place stock lengthwise and on an angle and plane chamfers.
14. Sand with 1/0 abrasive paper and sandpaper block.
15. Repeat with 3/0 abrasive paper.
16. Stain. Let dry overnight.
17. Measure 1 in. from ends, and ¼ in. from grooved edge. Place dots with scriber. These are for drilling later.
18. Shellac. Let dry overnight.
19. Rub down lightly with 3/0 sandpaper.
20. Varnish. Let dry overnight.
21. Rub down with linseed oil and steel wool.

Plastic

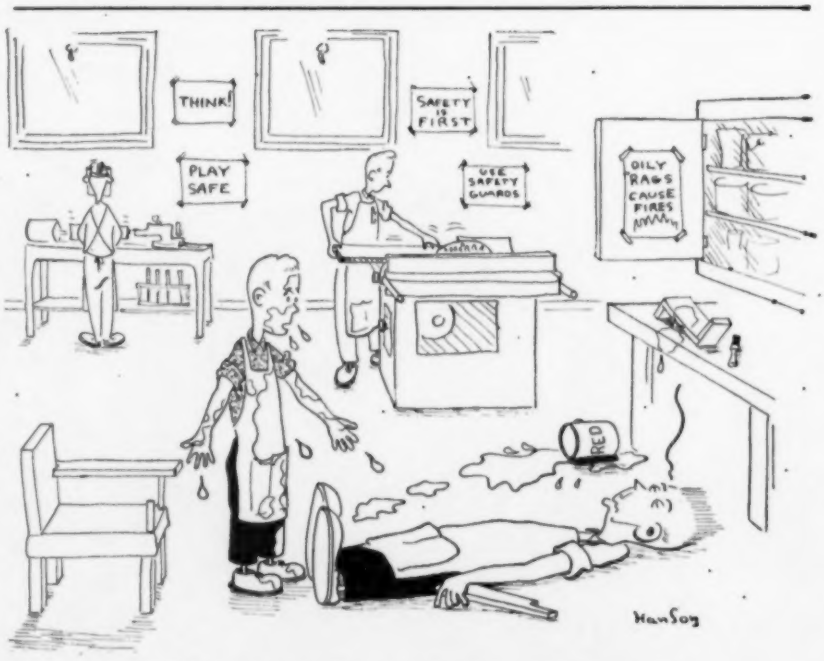
1. Plastic is rough cut to 1¾ by 3¾ in., on band saw by instructor.
2. File one edge. CAUTION: Do *not* remove paper protective coating; place carefully in vise, as plastic marks easily.
3. Check with try square.
4. Measure ¼ in. from edge. Draw parallel line with rule and pencil.
5. File bevel to this line.
6. Check with try square.
7. File one end square with beveled edge.
8. Check with try square.
9. Measure 3½-in. length with rule and pencil. Square with try square.
10. File to line.
11. Check with try square.
12. Other edge may be left rough or reasonably square and close to desired size as it will be hidden in final assembly.
13. Sand with 3/0 abrasive paper.
14. Smooth with 400 silicon carbide paper.
15. Buff bevel and ends on buffer.

Assembly

1. Remove paper from plastic and slide into groove. Do not force. If too tight, remove and file plastic slightly. If too loose, replace paper.
2. Set drill in drill press.
3. Drill holes previously marked. Holes should be drilled through one side of the wood and completely through plastic. CAUTION: Plastic may split if holes are not drilled completely through it.
4. Fasten together with brads.
5. Set brads 1/32 in., with nail set and hammer.



Detail drawing of the windshield scraper



"It's paint, Mr. Durdin . . . red paint . . . Mr. Durdin!"

— Harry L. Hanson, formerly at Atwater High School, Atwater, Minn. Now at Minneapolis, Minn.

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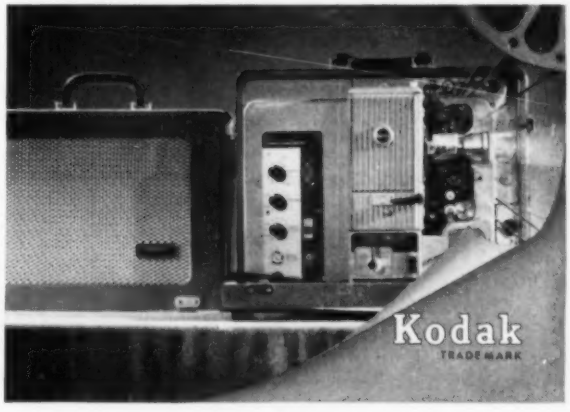

PERSONAL NEWS

(Continued from page 6A)

State Employees Association; and was a member and chairman (for 5 years total) of the Personnel Board of the City of Madison, Wis.

Since his retirement Mr. Thayer has moved to Vista, Calif.

JOHN PLENKE SUCCEEDS H. C. THAYER

John R. Plenke, Jr., has succeeded Harry C. Thayer as Chief, Trade and Industrial Education, State Board of Vocational and Adult Education, Madison, Wis.

Mr. Thayer retired several months ago.

John Plenke, Jr.

Mr. Plenke was born on November 30, 1907 at Wisconsin Rapids, Wis., where he received his earlier education. Upon graduation from high school he attended Oshkosh State College, Oshkosh, Wis.; the University of Wisconsin, Madison; Iowa State College, Ames, Iowa; Stout State College, Menomonie, Wis.; and received trade experience as machinist, and civil engineering aide, and in carpentry, and drafting. He received a bachelor of education degree and the M.S. degree.

He was a member of the Leadership Conference at Colorado A. & M. College in 1954.

Mr. Plenke's educational activities include industrial education committee work with the Wisconsin Education Association; the vocational education committees of the Wisconsin Association of Vocational and Adult Education; president of the Wisconsin Rapids Teachers Association; teacher of industrial education and vocational education since 1929 in high schools, vocational and adult schools and Stout State College, Menomonie; chairman, curriculum committee, high school industrial arts departments; and president of graduate club, 1955, Stout State College.

He was a member of the U. S. Office of Education Conference on Technical Education (1956) held in St. Louis and Washington, D. C.; chairman, Central Regional Vocational-Technical Education Conference; speaker: Guidance Conferences in Wisconsin AVA, and other joint educational conferences; and chairman, professional committee, Wisconsin Administrator's Association.

Mr. Plenke has prepared articles and reports on technical education for various Wisconsin State Newsletters; also for Technical Education News, and Technical Education in Wisconsin.

ROBERT H. HAWLK IN NEW POSITION

Robert H. Hawlk has been employed to teach ceramics, woodworking, and history in the Department of Industrial Arts at Ohio University, Athens, Ohio. He taught at Stroudsburg, Pa., for the past 14 years. During this time he instituted a work-experience program as a part of the industrial-arts curriculum. This program has been in operation for the past 5 years.

Mr. Hawlk obtained his bachelor's degree at State Teachers College in Kutztown, Pa. His master's degree was taken at Pennsylvania State University; and he has completed the requirements for a doctorate at Pennsylvania State University, with the exception of completion of his dissertation. His dissertation topic deals with the organization of work-experience programs for the public schools.

There are now ten regular faculty working in the industrial-arts program at Ohio University in Athens. The new industrial technology program which has been organized by this department now has a total enrollment of approximately 120 upperclassmen. Currently, the faculty at Ohio University are re-evaluating this program to see what improvements might be made after 4 years of experimentation in this area.

DR. ROBERT D. HUNTOON

Dr. Robert D. Huntoon has been named Deputy Director of National Bureau of Standards, U. S. Department of Commerce, Washington, D. C. The announcement was made by Dr. Allen V. Astin, director of the Bureau.

In this post, Dr. Huntoon will serve as alternate to the Director in external matters, and will exercise day-to-day direction and review of Bureau programs, working through the Associate Directors for Engineering, Chemistry, the Boulder (Colorado) Laboratories, Planning, and Administration. He will continue to serve as Associate Director for Physics.

(Continued on page 16A)

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No. 886 Jig Saw
No. 882 Orbital Sander
No. 887 Jig Saw Table
No. 883 Bench Saw
No. 8810 Bench Grinder
No. 8816 Drill Press Vise
No. 8820 Floor Polisher
No. 8818 Plane Attachment
No. 881 Bench Stand
No. 8821 Hedge Trimmer
No. 8814 Drill Press Stand

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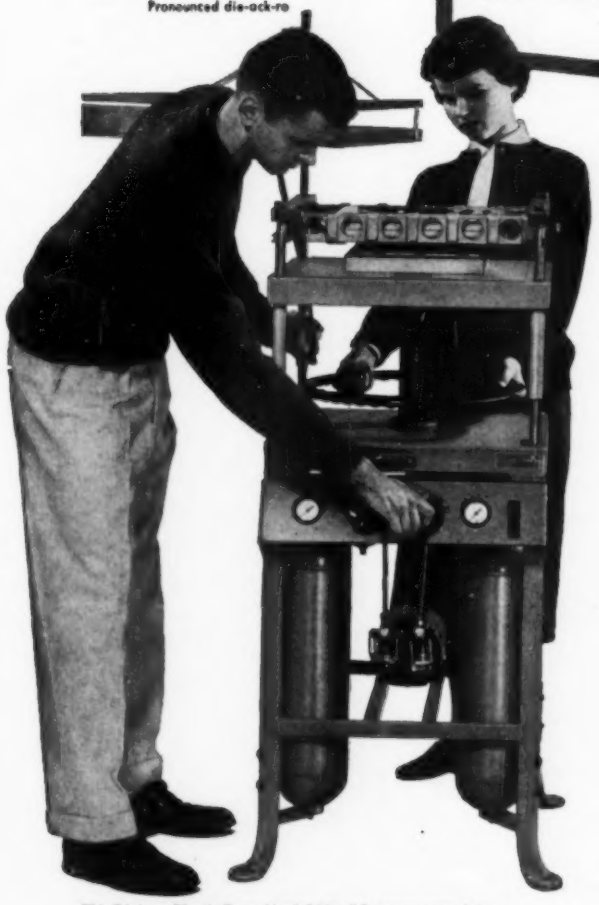

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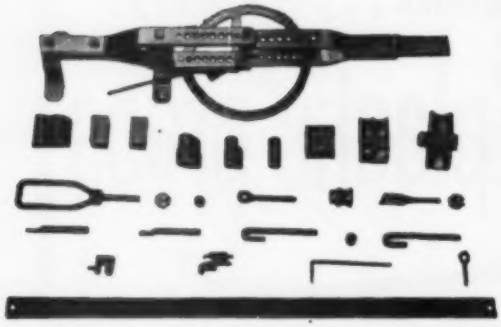

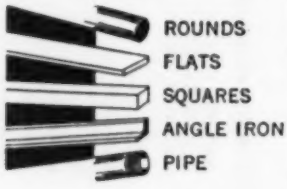

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PERSONAL NEWS

(Continued from page 14A)

PERSONNEL AT ONTARIO COLLEGE

T. G. Luther, who has been for several years a lecturer in Industrial Arts at Ontario College of Education, University of Toronto, at Toronto, Can., completed the requirements for his B.A. degree, which was granted in June. He was promoted to the rank of Assistant Professor in July. Professor Luther is presently enrolled in the M.Ed. course.

Edgar P. Emerson, for the past three years a lecturer in industriai arts at this college, was enrolled at Wayne University last summer in the course leading to a master's degree in his field. Mr. Emerson was promoted recently to the rank of Assistant Professor.

Professor John C. Spry of the college staff was principal of the industrial arts summer school in July. Courses were offered leading to the elementary and specialist certificates.

The present enrollment in the year course for Intermediate certificate in industrial arts at this college is 45.

NEW STAFF MEMBERS

New staff members this year in the industrial-arts department, at Western Illinois University, Macomb, Ill., are: Dr. Fred Zimmerman, Evansville, Ind., woods and electricity; Charles Meline, Fargo, N. Dak., graphic arts; and Verner Johnson, Theif River Falls, Minn., drafting.

Dempsey E. Reid is acting head of the industrial-arts department.

NEW FACULTY MEMBERS

The Industrial Arts Division faculty at State University of New York Teachers College, Oswego, N. Y., have added the following persons to their staff.

Raymond L. Cornwell has been appointed associate professor of graphic arts. He has served as printing and graphic arts instructor at Stout State College, Menomonie, Wis., and has taught printing at the Senior High School, Racine, Wis.

Richard N. Hall, assistant professor of industrial arts, has been a general shop instructor at Moclips, Wash., Junior and Senior High School.

Henry S. Paulin has been appointed assistant professor of industrial arts, after previous assignments at a high school and art institute in Zanesville, Ohio, and at Kent, Ohio, Junior High School, where he offered courses in ceramics, industrial arts, and art.

Dr. Charles W. Phallen has been appointed associate professor of industrial arts education. He has been a teacher of physics and industrial science at Whittier Union High School, Whittier, Calif., and at Richwood, Ohio, High School, where he taught physics, industrial arts, and mechanical drawing.

WAYNE WETZEL IN RETIREMENT

Wayne Wetzel retired September 1, 1958, from active teaching in the industrial-arts department at Western Illinois University, Macomb, Ill. He has been teaching in this department at Western for a period of 45 years. For the past forty years he served as head of the department.

His career, which began in 1913, has been highlighted by many significant contributions to teacher education. Under his direction Western Illinois University was one of the first colleges in the nation to have Safety and Driver Education.

Mr. Wetzel was honored at a recognition dinner last summer, at which time many of his friends participated. Among the guest speakers were E. M. Claude, state supervisor of vocational education, Springfield, Ill.; Dr

Fred Schmidt, Ball State Teachers College, Muncie, Ind.; and Dr. Ray Stambaugh, State Normal University, Normal, Ill.

Both Mr. Wetzel and his wife were presented with gifts. They will continue to make their home in Macomb, when not traveling.

ALBIN V. LARSON, EDUCATOR, RETIRES

Albin V. Larson, who had been a teacher at State Teachers College, Peru, Neb., for the past 32½ years, retired in September, 1958.

He was born at Arapahoe, Neb., on May 16, 1890. Following his graduation from the Arapahoe High School in 1908, he studied mechanical engineering and received his B.Sc., from the University of Nebraska in 1914. He continued his education at the University of Chicago, and later at the University of Nebraska — summer sessions. He received the M.A. degree from the University of Minnesota in 1929.

Albin V. Larson

His years of teaching included two years in rural schools, Arapahoe, Neb., two years in high school, Wahoo, Neb., and nine and one half years at Columbus, Neb., before joining the staff at Nebraska State Teachers College.

Mr. Larson served as secretary-treasurer of the Industrial Arts Section of Nebraska State Teachers Association; president of the Section, District II; president of Nebraska State Industrial Education Association in 1935; was a member of the Board of Trustees, Nebraska Industrial Education Association; and president of Nebraska Vocational Education Section of Nebraska State Teachers Association District II in 1950.

He received the Laureate Citation of Epsilon Pi Tau in 1935, and served as Trustee of Eta Chapter since 1945. He served on the Editorial Committee on the Program of Industrial Arts for Nebraska Schools since 1928. He is a member of Phi Delta Kappa, Epsilon Pi Tau, and was one time a member of the Mississippi Valley Manual Arts Conference.

His contributions to educational literature include "A Summary of a Study Made of Industrial Arts Teachers and Their Work in Nebraska 1923–1927," published by the State of Nebraska, Department of Vocational Education, Lincoln, Neb., 1929.

Mr. Larsen's successor is Dr. Owen Harlan, formerly at Buffalo.

MR. BARNHART RETIRES

J. L. Barnhart, who spent forty-three years as an instructor in the shop department of the Salem-Oak Harbor Public Schools at Oak Harbor, Ohio, retired recently.

His successor at the school is Roger Carpenter. He is a former student, who was later graduated from the Department of Industrial Arts, Bowling Green College.

(Continued on next page)

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- 10-pound cutter-head-and-spindle are *one piece*, precision ground for perfect balance – can be quickly removed and blades sharpened while in cutter-head – a real time saver.
- Lubricated-for-life ball bearings.
- Blades guarded front and rear of fence.
- 32" x 4½" fence slides smoothly on machined ways, locks or releases instantly, *always* touches rear table for added safety.
- To save you time, rear table is stationary for permanent alignment with head.

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The Atlas sander equips your shop for finishing projects of almost any shape or size – in a fraction of the time and without the difficult hard work of hand sanding. It sands boards of any length, width or shape – angles and double angles – metals and plastics as well as wood.

Has 10" diameter disc . . . 4" wide belt . . . four sealed-for-life ball bearings. Table tilts 45° . . . may be used with either disc or belt. Belt sander operates in both horizontal and vertical positions. Belt guard and stop are removable for sanding curved pieces on either drum, and disc and guard are easily removable for handling wide boards on belt. Ruggedly built throughout for trouble-free service. Write for literature today.

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PERSONAL NEWS

(Continued from previous page)

DR. FRED SCHMIDT, JR. DIES

Dr. Fred J. Schmidt, Jr., Professor and Head of the Industrial Arts Department, Ball State Teachers College, Munice, Ind., died of a heart attack at Ball Memorial Hospital on October 17, 1958, after an illness of three weeks. He was born in Iowa on March 4, 1895, and is survived by his wife, Beulah, and one son, Robert J. Schmidt, a professor of biology at the State Normal University, Normal, Ill. His mother, Mahala Schmidt, one brother, Herbert Schmidt, and two sisters, Ethel Schmidt, and Annice Schmidt Oelke, live in Garnaville, Iowa.

Dr. Schmidt has been engaged in administration, supervision, and teaching of industrial arts for many years. He taught at Boxholm, Iowa, and was superintendent of schools at Eagle Grove and Farmersburg, Iowa, high schools. He also taught at Iowa State Teachers College and Iowa State College. He organized guidance programs in C.C.C. Camps for the State Department of Public Instruction, Des Moines, Iowa. He received his B.S. degree from Iowa State Teachers College in 1923, the M.S. degree from the University of Wisconsin in 1928, and the Ed.D. degree from Indiana University in 1951. He joined the Ball State Teachers College staff in 1935, and taught industrial arts at the Burris Laboratory School. On September 1, 1947, he became head of the Industrial Arts Department.

Dr. Schmidt was a member of the College

Dr. Fred J. Schmidt, Jr.

Avenue Methodist Church, Muncie, Ind. He was a member of the State Teachers Association; the NEA; the AVA; the Indiana Industrial Education Association; a life member of the American Industrial Arts Association; an honorary member of the Connecticut Industrial Arts Association; member of the American Council on Industrial Arts Teacher Education; the National Association of Industrial Teacher Trainers; the Mississippi Valley Conference; and a trustee of Beta Chapter of Epsilon Pi Tau, International Honorary in Industrial Arts and Vocational Education. He was past president of the American Industrial Arts Association, and a member of the executive committees of the American Industrial Arts Association and the Indiana Industrial Education Association. He was a member of numerous committees on the Ball State Teachers College Campus.

Dr. Schmidt traveled through Europe, England, France, and Germany in World War I. He also did summer teaching at Bellingham, Wash., and traveled widely throughout the United States. His hobbies were photography, travel, hiking, crafts, and antiques.

Besides being a life member of the American Industrial Arts Association and a Laureate member of Epsilon Pi Tau, Dr. Schmidt has written numerous professional articles, the most notable being "The Evaluation of an Arts Workshop," in 1944, Ball State Teachers College, Muncie, Ind. Besides attending numerous national and state conferences, he has had time to participate in the membership of the Industrial Arts Club, Phi Delta Kappa, AAUP, and the Torch Club.

In his honor, Ball State Teachers College Foundation has established the Fred J. Schmidt, Jr., Memorial Scholarship Fund. Individuals and professional organizations wishing to contribute to this scholarship fund may do so through the Development Office, Ball State Teachers College, Muncie, Ind. — *Henry A. Loats.*

DR. H. G. PALMER DIES

Dr. H. G. Palmer, professor of industrial arts at the Iowa State Teachers College, Cedar Falls, Iowa, died on Wednesday, October 22, 1958, after a ten-day illness.

Born in Cedar Falls in 1897, he received the B.A. degree from Iowa State Teachers College in 1923, the M.A. degree from the University of Iowa in 1932, and the Ph.D. degree from Ohio State University in 1950.

Before joining the Teachers College staff in September, 1924, he was a high school instructor at Hanlontown, Clear Lake, and Thornburg. He served as department head from 1948 to 1954.

Dr. Palmer has held executive positions with the American Industrial Arts Association and

(Continued on page 20A)

SHELDON
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Better Machine Tools for Teaching
... safer to operate, easy to learn on

For every school shop, laboratory and classroom ... (from beginning classes in industrial arts and vocational education through advanced courses in trade schools and universities) ... Sheldon builds a lathe to fit each academic, space and budget requirement.

Sheldon lathes are modern in design. With their easy-to-operate controls, students can learn basic lathe operations quickly and rapidly advance to practical shop projects.

From the largest 15" swing geared head lathe to the smallest 10" swing bench lathe, every Sheldon-built lathe meets the same rigid standards ... standards that insure long life with minimum maintenance requirements in your school shop.

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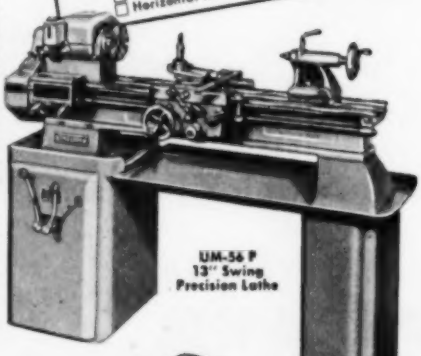
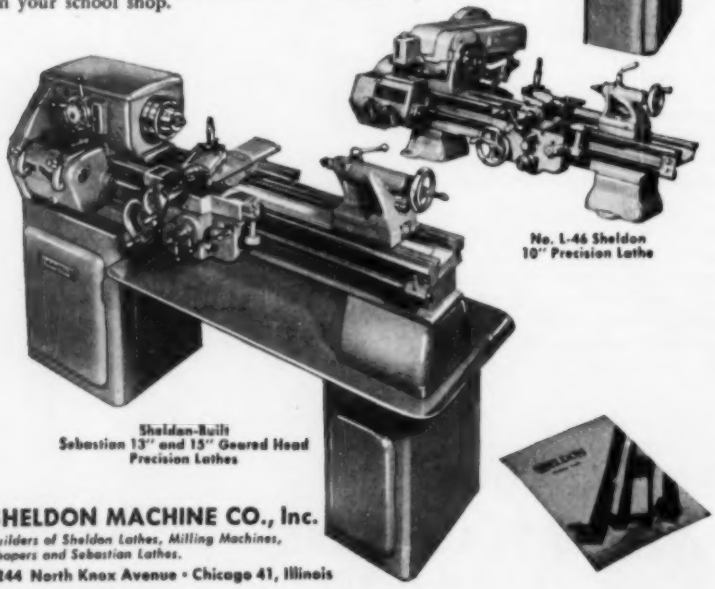
☐ 10" ☐ 11" ☐ 13" Sheldon Lathes
☐ 13" ☐ 15" Sebastian Geared Head Lathes
☐ Horizontal Milling Machine ☐ 12" Shaper



UM-56 P
13" Swing
Precision Lathe



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10" Precision Lathe

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Sebastian 13" and 15" Geared Head
Precision Lathes

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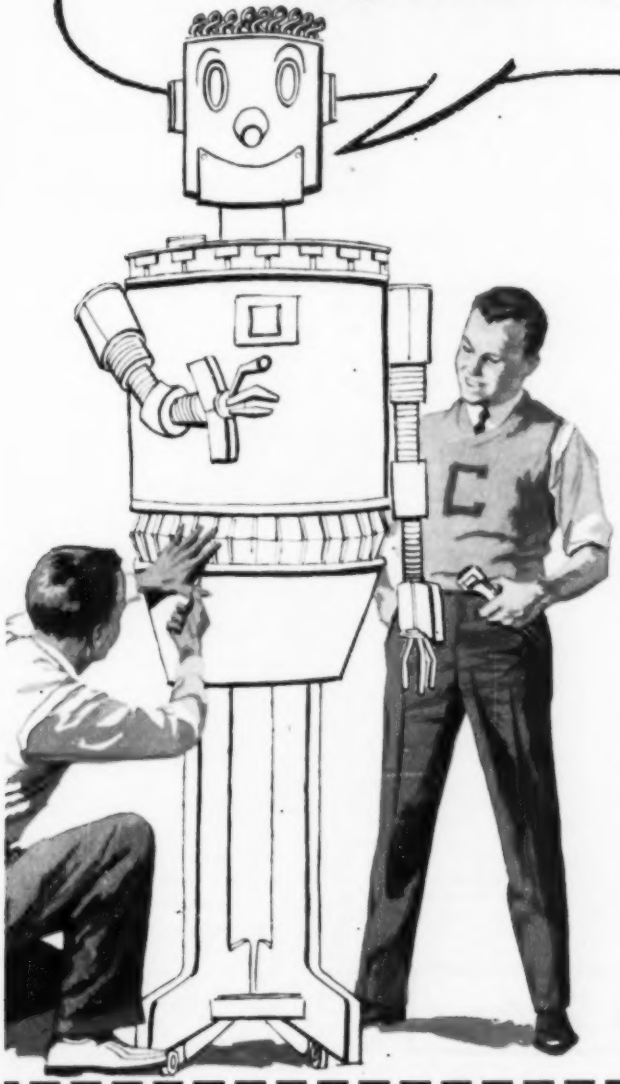
How about your students . . . are they preparing for the big FORD IAA program?



Sign up now for the biggest industrial arts competition in the U.S.A.

It's fun! It's educational! It's free! It's the biggest, most popular competition of its kind . . . the annual Ford Motor Company Industrial Arts Awards Program!

You and one of your students could easily be the winner of national recognition, one of hundreds of cash prizes, or a fun-packed, all-expense trip to Detroit—the industrial capital of the world!

Any industrial arts or industrial vocational project may be entered if made by a 7th through 12th grade student under the supervision of a shop or drafting teacher.

So if you haven't entered . . . act now! This is your chance to show the world your students' work.

Entries must be received by:

JUNE 10 Salt Lake City, Utah—for projects made in Montana, Wyoming, Colorado, New Mexico and states further west!

JUNE 25 Dearborn, Michigan—for projects made in all other states.

Enter your students right away!

FORD INDUSTRIAL ARTS AWARDS, Dept. B

FORD MOTOR COMPANY

INDUSTRIAL ARTS AWARDS FORD MOTOR COMPANY

FORD MOTOR COMPANY, The American Road, Dearborn, Michigan

I am anxious to have the official I.A.A. rules booklet and entry blanks.

Please send to:

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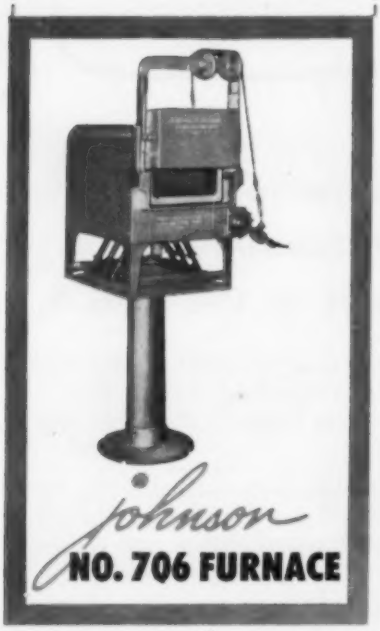
CITY_____ ZONE_____ STATE_____

HELPS YOU TEACH



Helps you teach a variety of heat treating techniques — hardening, tempering and annealing steels.

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BENCH MODEL $314.00
No. 654 — smaller version, 4 burners, 5" by 7¾" by 13½" firebox —
PEDESTAL $191.00
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(All Prices F.O.B. Factory)

Six No. 5, Type A Bunsen Burners give this versatile furnace a 400° to 1800° F. range. Temperatures easily controlled. Ratchet-operated door opens upwards. Use with natural, artificial, mixed or bottled gas. Economical and efficient with all. Firebox 7" by 13" by 16½". 78,000 BTU's per hour (natural gas).

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plus information on factory reconditioning your present Johnson Furnaces.

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If it burns gas look to Johnson — Since 1901

JOHNSON GAS APPLIANCE COMPANY
585 E Avenue N.W., Cedar Rapids, Iowa

PERSONAL NEWS

(Continued from page 18A)

also with the Iowa Industrial Arts Association.

He is survived by his widow and two sons. A third son was killed in the Korean War.

MR. VAN WYCK, EDUCATOR, DIES

Philip S. Van Wyck, senior adviser, Government Technical Institute, Insein, Burma, died on October 7, 1958, in Rangoon, Burma, after a brief illness.

He was the leader of a group of advisers sent by Dunwoody Industrial Institute to the Government Technical Institute under the sponsorship of the Ford Foundation, and served in this capacity for the past four years.

Mr. Van Wyck has had a distinguished career as a vocational educator and public servant. He was acting director of the Vocational and Technical School at Tacoma, Wash., prior to his departure for Rangoon, Burma. As a UNESCO consultant, he worked in Bangkok with the Government of Thailand on the development of vocational programs. Between 1947 and 1949 he was the president of Farragut College and Technical Institute, Farragut, Idaho.

Mr. Van Wyck served in many capacities with the United States government. He was the director of the Bureau of Training of the War Manpower Commission and the chief of the Division of Occupational Analysis and Industrial Services. Other positions he held include work with the Federal Security Agency, U. S. Civil Service Commission, and the National Youth Administration.

He was head of the Machine, Mechanical Drafting, and Auto Departments at Dunwoody Industrial Institute, and taught at the University of Washington, Seattle; Idaho State College; and Colorado A. and M. College.

In his work with the railroads and the mining companies in northern Minnesota, Mr. Van Wyck made many friends.

He was active in many professional societies, including the American Society of Mechanical Engineers and the American Vocational Association.

He was a graduate of Mechanical Engineering from Purdue University.

Funeral services were at Rangoon, Burma.

WILLIAM C. ASH DIES

William Cook Ash, "father" of vocational education in Philadelphia, Pa., died on October 25 at Bryn Mawr Hospital. He was 82 years old.

Mr. Ash was principal of the city's first trades school, from 1906 to 1918, and became the first director of the Division of Vocational Education in the public schools of Philadelphia, from 1918 to 1922.

News Notes

1959 KODAK HIGH SCHOOL PHOTO CONTEST

In its fourteenth year, the 1959 Kodak High School Photo Contest will offer 328 cash Honor Awards totaling $10,400. Last year's contest offered 128 prizes. The enthusiasm which greeted the upward changes in last year's contest has prompted Kodak again to boost the number of cash prizes for which the nation's high school photographers will compete.

Other changes in the contest will include an increase in the top prizes to $400 and a division into two competing school grade groups

(Continued on page 22A)

NOW YOU CAN GET
Guaranteed Quality
in
School Shop Lumber

Here is why we can guarantee the quality of our school shop lumber!

1. Our lumber comes from the Great Smoky Region of the Appalachian Mountains—source of America's finest hardwoods.

2. The lumber designed for school shop use is especially selected for texture from properly kiln-dried stock, and manufactured with precision.

3. We know the kind of lumber you need to get best results with minimum waste—*and that is the kind we ship!*

4. We feature direct-from-mill-to-school delivery via truck transports. All shipments are carefully packaged; steel-strapped into tight, compact units with edges of lumber protected by corner brackets. Your lumber reaches you dry, clean and bright.

For better lumber that will give you better results; for guaranteed quality and dependable service, send us your bidding specifications.

READY-TO-SHIP ITEMS

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BALSA	CHESTNUT	RED CEDAR	WILLOW
BASSWOOD	LIMBA	RED OAK	BIRCH DOWELS
BEECH	MAHOGANY	WALNUT	DRAWING BOARDS
BIRCH	MAPLE	WHITE OAK	PLYWOODS

BALL BAT BILLETS TURNING SQUARES

SAVE MONEY!

If your school is in a state east of the Mississippi, or in Arkansas, Kansas, Louisiana, Missouri, Oklahoma or Texas—we can save you money! See our catalog 1958-S for delivered prices. Catalog sent FREE on request, postpaid.

MAIL US YOUR RUSH ORDER TODAY!

HARDWOOD CORPORATION OF AMERICA
EDUCATIONAL LUMBER DIVISION
P. O. Drawer 1091, ASHEVILLE, N. C.

IRWIN School Shop Special

Stock No. D-13
SIZES ¼ to 1"

Set of 13 Irwin Wood Bits and colorful Metal Storage Rack

This new Irwin bit set and rack helps keep tools in place, teaches neatness in your shop. Assignments will be completed quicker, too. Irwin solid center bits cut clean, fast, accurate. Each Irwin bit hardened full length to stay sharp longer. Durable steel rack screws on wall or bench. Patented spring-steel clips hold bits firmly in place. Size markings on rack for easy selection. Quantity limited—so see your independent hardware dealer soon.

FREE BOOKLET: Tells How to Select, Use, Care for Auger Bits. A useful training help for School Shops. Send name and address to Irwin, Dept. 12A, Wilmington, Ohio.

IRWIN Wilmington, Ohio — the original solid center auger bit • screw drivers • screw driver bits

every bit as good as the name

ARMSTRONG
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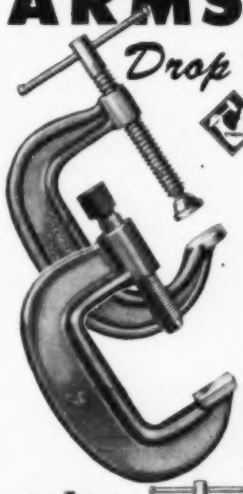

LEADERS IN THE DROP FORGED CLAMP FIELD

. . . in design, machining and strength; in completeness of line in both sizes and types.

Designs are based on a full knowledge of clamp uses and requisites. Drop forging assures die-perfect form, texture toughness and freedom from structural faults. Maximum stiffness is attained by a discerning selection of steels with accurate controlled heat-treating, tempering and testing.

For dependability and long useful life, specify and standardize on ARMSTRONG Drop Forged Clamps.

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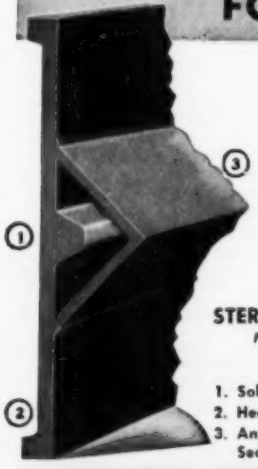

When you specify Sterling Flasks, you get the very best that money can buy. For Sterlings are backed by almost a half century of "know-how" in fabricating precision-built foundry flasks. Sterling pioneered and perfected the famous ROLLED STEEL CHANNEL construction, long proven superior under rough foundry usage. That's why, today, you fill find Sterlings in more than 4500 foundries. Write for Catalog No. 698 describing the complete line of Sterling Foundry Equipment.

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Founded 1904 as Sterling Wheelbarrow Co.
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1. Solid Rolled Reinforcing Rib
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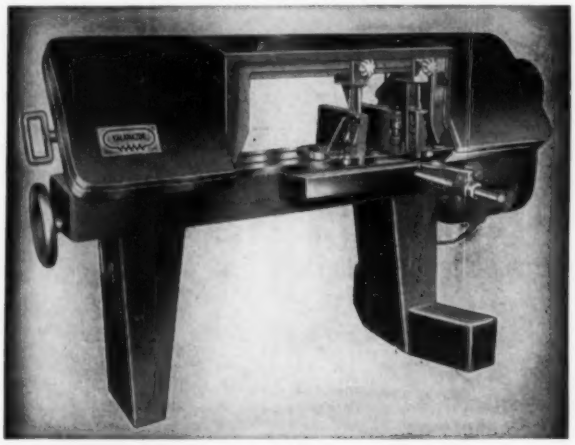

KALAMAZOO

METAL CUTTING BAND SAW

MODEL 8C
CUTS 8" ROUND, 16" FLAT STOCK, 8" PIPE

Good tools make teaching good workmanship easier. That's why most leading schools use *Kalamazoo* Metal Cutting Band Saws. Specify *Kalamazoo* for accuracy and safety. Four models, available with casters and coolant. Get full details *now*.

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125 HARRISON STREET KALAMAZOO, MICHIGAN

NEWS NOTES

(Continued from page 20A)

instead of four. Certificate recognition will also be given to runners-up.

Top prizes in the Junior Division (grades 9 and 10) will be $300, $200, and $100 in each of the four contest categories. Parallel prizes in the Senior Division (grades 11 and 12) will be $400, $300, and $200. Thus winners in the lower grades with two to three years more of school ahead of them will have the incentive of still higher awards to shoot for.

There will also be twelve Special Awards in each group for $25 and $50 respectively, 140 Honorable Mention Awards of $10 and 140 of $15, as well as Certificates of Merit.

There are no limitations on subject matter, but for purposes of judging and awarding prizes, there are four broad classifications of entry as follows: (1) School Activities; (2) People (no school pictures); (3) Pictorials; and (4) Animals and pets. It is again emphasized that it is subject matter and the way it is handled, or in other words, the young photographer's ability to "see" his picture, that creates a winner. Although the contest is for black-and-white photography, there are no restrictions on the make of camera or film.

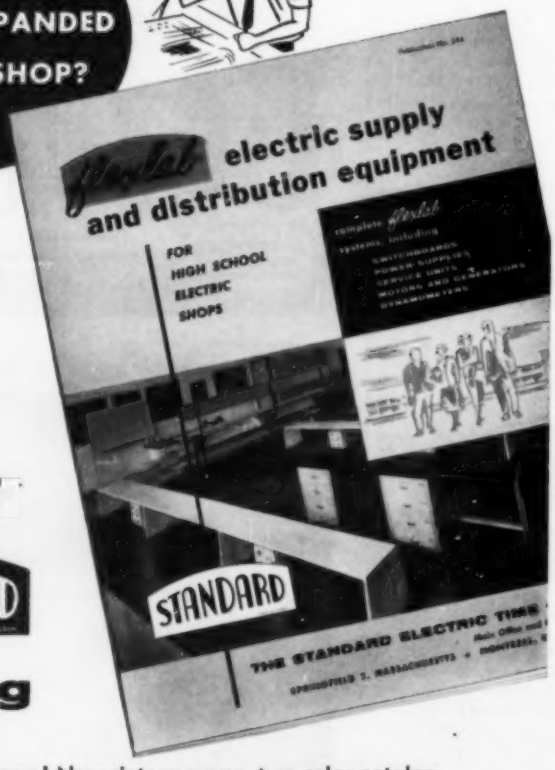
Boys and girls attending daily any public, parochial, or private school (grades 9–12) in the United States and its territorial possessions are invited to enter pictures in this national competition.

In addition to the larger cash prizes, winners will also have the distinction of having their prize-winning photos included in a traveling exhibit which each year is reaching a larger and larger world-wide audience.

Any pictures taken after April 1, 1958, will be eligible. Entries will be received between January 1 and March 31, 1959, with judging in late April.

Further details, together with practical prize-winning hints, can be had by writing to *Kodak High School Photo Contest, Rochester 4, N. Y.*

PLANNING A NEW OR EXPANDED ELECTRIC SHOP?



you'll want this NEW STANDARD catalog

Just off the press! New sixteen page, two color catalog, profusely illustrated, contains a wealth of useful information, including:

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- Recommended shop equipment.
- Illustrations, information and specifications on STANDARD:
  - SWITCHBOARDS • ENCLOSURES • SERVICE OUTLETS
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A copy is yours for the asking.

THE STANDARD ELECTRIC TIME COMPANY

89 LOGAN STREET • SPRINGFIELD, MASSACHUSETTS

REFINISHING THE FLOOR'S SURFACE

A trend toward renewed popularity of scatter rugs has been reported in the home furnishings field. In various shapes from rectangular to oval, the rugs are drawing new attention to floors.

With increased exposure of the wood floor, more thought is being given to refinishing the floor's surface. The beauty and durability of time-tested, shellac-finished wood is being rediscovered. Fresh, thin coats of pure, white shellac are favored for floor finishing. For centuries shellac has been used by master craftsmen for this purpose as the wood floors at Versailles attest.

Once the surface is cleaned of all wax, oil and film, a shellac-finished floor can be easily touched up or refinished. A pure, thin coat of the fresh, white shellac can be applied right on the clean, prior shellac finish.

Working with the bare wood floor, ideal results can be obtained by applying two or three coats of shellac. Each coat should be allowed to thoroughly dry before the next is applied. As thin shellac dries rapidly, two coats can be applied in a single evening and a third on the following day.

For free information on finishing floors, write the *Shellac Information Bureau, 51 Pine Street, New York 5, N. Y.*

EASY DOES IT

Easy does it is the byword where industrial materials handling is concerned. And how to do it that way is told in a recent National Safety Council publication — "Easy Does It."

The pamphlet reports that one out of every four work injuries results from moving objects.

Included in "Easy Does It" are tips on how to pile and lift, plus rules for driving power trucks.

Descriptive literature about the pamphlet and information on quantity prices may be obtained from the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

CITIZENSHIP IN ACTION

Citizenship in Action, a new film for the use of student councils, social studies classes, guidance counselors, and others who help young people to become interested in civic affairs and to learn more about how democratic government functions, has been released by the Audio-Visual Center, Indiana University, Bloomington, Ind. Sound, black and white, 23 minutes.

Prints can be purchased from the *Audio-Visual Center, Indiana University, Bloomington, Ind.*, and from the *Educational Film Library Association, 250 West 57th St., New York 19, N. Y.* Also available on an annual rental plan that leads to ownership.

INDUSTRIAL ARTS VACATION WORKSHOP

The Third Annual Industrial Arts Vacation Workshop, which was sponsored by the Birch Coulee Industrial Arts Club in co-operation with the Bemidji State College and the Minnesota State Department of Education (Vocational Division), was held at the State FFA Camp located 15 miles north of Virginia, Minn., from August 17 through August 23, 1958, and was open to all industrial-arts

instructors who were interested in attending.

The workshop is financed by the men who attend and it is organized under the supervision of the Bemidji State College and the State Department of Education, Vocational Division.

This year the project work was concentrated in junior high electricity, and the instructors chose to make pistol-type soldering coppers and a small two-transistor radio.

The instructional staff was headed by Phillip Ruehl of Stout State College, Menomonie, Wis.

Formal instruction got under way at 8:00 a.m., Monday, August 18, and continued through Saturday noon, August 23. Each day was broken up into periods of lecture, demonstrations, and project work. The evening program was devoted to films on related fields of electricity and recreation.

On Wednesday morning a field trip was taken through the Virginia Light and Power Plant.

On Friday evening a business meeting was held in conjunction with the workshop, and Floyd Wurscher and Fred Rowell were elected chairman and co-chairman for the Fourth Annual Industrial Arts Workshop. Mr. Wurscher is instructor of industrial arts at Gaylord, Minn., and Mr. Rowell is industrial arts instructor at Richfield, Minn.

The workshop evaluation session was held Saturday morning followed by distribution of door prizes, luncheon, and dismissal.

SECOND ANNUAL WORKSHOP

Western Michigan University, Kalamazoo, conducted its Second Annual Industrial Arts Workshop on their campus on November 15, 1958.

Experiences were offered in eight areas, i.e., wood lamination, transistor radio, patternmaking, foundry, graphic arts, ceramics, free form metal, and plastics.

Teachers registering for the workshop spent the morning session working in one area and the afternoon session in a second area. This time was spent in both lecture and actual shop work. Experts in these areas served as leaders.

WAR ORPHANS EDUCATION PROGRAM

Several thousand young men and women in the Philippine Islands now can attend Philippine schools with financial help from the United States, under a law signed recently by the President.

The law extends benefits of the War Orphans Education program to Philippine educational institutions. Eligible for War Orphans schooling are young people in their late teens and early twenties whose parents — veterans of the Philippine Scouts and American Forces of World Wars I and II — died in service or of conditions resulting from service.

The new law not only brings in the Philippines but the Canal Zone as well.

Previously, War Orphans Education was limited to students in schools in the United States, its territories and Puerto Rico.

New Publications

Technical Drawing

By Frederick E. Giesecke, Alva Mitchell, and Henry Cecil Spencer. Cloth, 844 pp., 7¼ by 10¼ in., illus., $10. The Macmillan Company, New York, N. Y.

This is the fourth edition of this well-known text on drafting.

It has not only been brought up to date, but very much enlarged. New figures illustrate the text and the new appendices contain the latest tables and include the new ASA tables of metal fits.

Henry Cecil Spencer, who has prepared this fourth edition, is a member of the American Standards Association for drafting room practice.

The 29 chapters, besides covering all of the usual descriptive material found in books on drafting, has chapters on axonometric projection, engineering graphics, structural drafting, piping drafting, welding representation, aeronautical drafting and lofting, a chapter on patent drafting, and one on the reproduction of drawings.

Most-Often-Needed 1958 Radio Diagrams and Servicing Information

Compiled by M. N. Beitman. Paper, 192 pp., 8⅜ by 10¾ in., illus., $2.50. Supreme Publications, Highland Park, Ill.

This is Volume 18 of the popular Radio series of Supreme manuals, and covers needed service material on all popular recent radio sets. Included are easy-to-follow schematics, needed alignment instructions, voltage values, location views, and photographs. In many cases, printed circuit boards are shown in phantom view for easy association with correspondingly connected parts.

The new manual covers all types of radios including combinations, record players, auto sets, and transistor portables.

Mathematical Tables and Formulae

By F. J. Camm. Cloth, 144 pp., 4⅝ by 7½ in., illus., $2.75. Philosophical Library, Inc., New York 16, N. Y.

(Continued on next page)

"What's New?" they ask

B-G

At the many conventions where B-G exhibits, it has been commonplace to have visitor after visitor come to our booth and ask "What's New?" And it's understandable—for B-G as one of the oldest and largest suppliers of industrial arts and vocational education equipment and supplies has lead in introducing "What's New?"

The very "newest of the new", however is something not for sale. It's the highly prized AVA Citation, shown above and in the top photo being awarded by Lowell A. Burkett, AVA Asst. Exec. Sec'y to B-G's Salesmanager Chuck Clawson at the recent Buffalo convention.

And speaking of conventions, B-G has been exhibiting at Industrial Arts, Vocational Education, School Business Officials, School Administrators, School Board and Fine Arts conventions—at both the national and state level, more than 40 a year for more than 25 years... and all to the end of keeping you abreast of new products, and time-saving methods that are constantly being introduced in Industrial and Vocational Education.

As you already know, you'll always find a warm welcome at the B-G booth—so look for us at your convention, and your only password is "What's New?"

B-G is the only company that has published a catalog continuously each year for over 30 years.

BRODHEAD-GARRETT CO.
4560 East 71 St., Cleveland 5, Ohio

"...QUALITY in considerable QUANTITY!"

Practically every teacher in the country has become familiar with this urgent appeal from the widely acclaimed "Rockefeller Report" on the needs of education in America.

And practically every teacher in *industrial education* knows that these words have a special significance for *him*. Few branches of education are more involved in the development of the special skills necessary for successful scientific and technological achievement.

The busy shop teacher also knows that American Tech books and study guides in QUANTITY can help him provide the QUALITY instruction so indispensable to today's demanding industrial world.

Send for on approval copies of these up-to-the-minute texts —

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NEW PUBLICATIONS

(Continued from previous page)

A sixth edition of a very useful book containing standard mathematical symbols; Greek and Roman numerals; mathematical constants; trigonometrical formulae; calculus; arithmetical, geometrical and harmonical progression; tables of square and cube root; permutations and combinations; simple and compound interest; present value and discount; annuities; Euler's numbers and constant; binomial theorem; algebraic identities; area of irregular figures; mensuration; formulas for triangles; velocity, acceleration, force, energy and power, horse power; electrical units, and electrical equations, Ohm's Law; heat, time, and velocity; pressure and equivalent pressures; water; force, energy, and power; units and equivalents; metric system, and conversion factors; standard density; density of solids and liquids; weights of various substances; table of elements, chords, and radians; natural sines, cosines, tangents, and their logarithms; powers and roots; and logarithms and antilogarithms.

Printing and the Allied Trades

By R. Randolph Karch. Cloth, 318 pp., 5½ by 8¼ in., illus. Pitman Publishing Corp., New York, N. Y.

This is the fourth edition. It is thoroughly revised and will assist both teacher and learner in the industrial-arts printing courses in junior and senior high schools, vocational printing in vocational, adult, and technical printing courses, together with the related subjects courses needed by the students in the schools mentioned above, as well as in classes in which the students are studying advertising and journalism in colleges and universities.

The 20 chapters present in interesting fashion, a brief history of printing, modern printing, foundry type, spacing material, straight composition, proving and correction, distribution, border and rules, layout and display composition, commercial printing, mechanical type casting, lockup and imposition, printing presses, printing plates, duplicate printing plates, ink and color, copperplate engraving, lithography, collotype and gravure, paper, accident and health hazards, type faces, and projects in type composition.

Coated Abrasives — Modern Tool of Industry

Prepared by Coated Abrasives Manufacturers Institute. Cloth, 426 pp., 6¼ by 9$\frac{15}{16}$ in., illus., $8.50. McGraw-Hill Book Co., Inc., New York, N. Y.

This informative book gives a thorough explanation of the nature, advantages, applications, and efficient methods of using coated abrasives. The book describes how coated abrasives are manufactured and how they can be used effectively.

The 17 chapters describe coated abrasive machines, contact wheels, drums, rolls, pads, cutting oils and coolants; grinding and polishing; finishing painted metal surfaces; use by woodworkers, leather workers and shoemakers, glass and plastic grinders and polishers, and maintenance and home workers. The economic factors in belt grinders, sanders, and finishers also are explained, as well as how to store and handle the coated abrasives.

A glossary also is included.

Fundamentals of Transistors

By Leonard Krugman. Paper. 176 pp., 5½ by 8½ in., illus., $3.50. John F. Rider Publisher, Inc., New York, N. Y.

This is the second edition of this book. To keep pace with the rapid advance in semi-

(Continued on page 26A)

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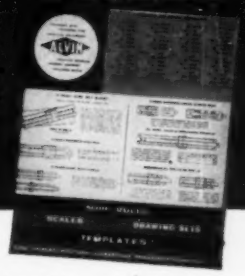

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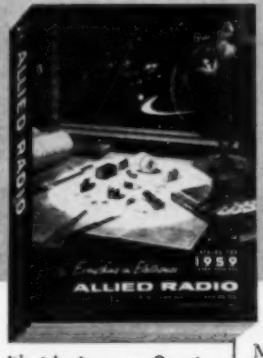

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NEW PUBLICATIONS

(Continued from page 24A)

conductor technology is the reason for the second edition of a text which originally appeared in 1954 and became widely known in the transistor field.

The author rewrote numerous portions of the original text and added a good deal of new material to bring the book to the technological level of modern transistor art. The new edition covers what was known in the past and still is in use, and in addition, deals with the theory, construction, and operation of most intrinsic significant semiconductor devices such as surface barrier, intrinsic, drift, avalanche and spacistor types. Illustrative circuits and design theory applicable to amplifiers, oscillators and high frequency applications reflect the present state of the art.

Review questions which emphasize major topics have been added at the end of each chapter. These aid the reader to measure the progress in understanding the material covered. Each chapter also includes an extensive list of references for those who desire more advanced treatment of specific derivations, concepts, circuit applications and design techniques.

The author has succeeded in retaining all the salient features of the first edition, especially the use of practical numerical examples which illustrate the formulas and equations. The illustrations are ample; they are clear and easily read.

Restoring and Maintaining Finishes

By George A. Soderberg and Paul W. Karcher. Cloth, 88 pp., 6¾ by 10 in., illus., $2.75. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This small but intensely interesting text is well worth deep study. It covers the subject of restoring and maintaining finishes excellently and quite fully.

It also contains definite information on restoring and refinishing antique furniture.

The book describes what tools, materials, and equipment are to be used, and describes color and how it works, how French polishing is done, identification of wood, control of moisture, raised grain and checked finishes, shows how to prepare a French pad, and how to French polish large areas, restore color and luster, remove water rings and stains, and press and packing marks, burn-in and remove surface scratches, restore grain pattern, and repair cigarette burn damages.

Wider Than the Sky — Aviation as a Career

By Charles Michael Daugherty. Cloth, 158 pp., 5⅜ by 8 in., illus., $2.95. Harcourt, Brace and Co., New York, N. Y.

Many youngsters bemoan the fact that there is little chance for them now that so much progress has been made in the field of aviation.

The author of this book, however, traces the development of aviation from the time of the Wright Brothers up to our present-day jets, missiles, and rockets, and demonstrates that these youngsters have as many or more opportunities both in private industry and government service than ever.

This is a truly interesting and helpful book.

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Every Chandler & Price paper cutter no matter what the size, is built to the same precision standards for accuracy in cutting, ease of operation and a lifetime of service. The C & P line includes the most complete selection of smaller cutters—automatic or hand-operated—to meet the needs of any vocational graphic arts department. You can choose a C & P cutter with full assurance it will fit your particular requirements. Compare C & P before you specify any cutter.

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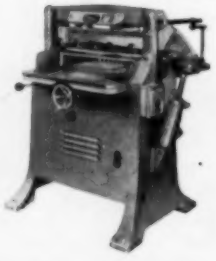
C & P hydraulically operated cutters provide the advantages of hydraulic cutter operation at minimum investment. Bigger production with less effort for the operator is the keynote. Two operating controls require the use of both hands when making cut—safe, efficient. Features include illuminated tape magnifier and scales inserted in table. Except for operation of clamp, both hand clamp and full hydraulic models are identical in construction.



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This cutter is designed for installation on bench or cabinet. The knife cannot fall accidentally nor cutting handle be pulled down until safety lock is held open by operator's left hand at start of each cut. The cabinet is optional equipment. Two sizes: 19½" and 23". Cuts and trims sheets up to 19" x 24" or 23" x 24".

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Business and Personal News

THE STANLEY WORKS ESSAY CONTEST

For the third successive year, The Stanley Works of New Britain, Conn., will sponsor an essay contest for the senior class of New Britain High School, on "The Role of Industry in the Development of America." Four cash prizes totaling $1,100 will be awarded.

Student papers will be prepared under the supervision of a committee of teachers headed by Miss Dorothy Quigley of the Social Studies department and judged by a committee consisting of Emerson H. Burr, treasurer of The Stanley Works, who will serve as chairman; Prof. Walter B. Fulghum, of the English Department of the State Teachers College located in New Britain; and Arthur E. McEvoy, managing editor emeritus of the New Britain Herald.

BROWN & SHARPE MANUFACTURING COMPANY

Herbert H. Upton and Thomas Hollis, Jr., were elected vice-presidents of the Brown & Sharpe Manufacturing Company at a board of directors' meeting held recently.

Mr. Upton continues in his capacity as general manager of the company's hydraulics division, and president of Brown & Sharpe's subsidiary, the Double A Products Company of Manchester, Mich.

Mr. Hollis will also continue in his present capacity as general manager of the cutting tool division, and president of another subsidiary, the Nelco Tool Company, of Manchester, Conn.

SALES SERVICE MFG. CO. DISTRIBUTORS

Stedfast & Roulston Company, Boston, has been appointed exclusive distributor for Press-

(Continued on page 28A)

IMPORTANT MESSAGE TO PLASTIC CRAFT TEACHERS!

COPE PLASTICS (formerly D. W. Cope Plastics) is proud to announce that we are now operating out of our brand new warehouse and plastics fabricating plant. Increased floor space, a greatly expanded inventory, an improved method of handling orders enables us to offer you IMMEDIATE SHIPMENT of PLASTICS FOR EVERY CLASSROOM NEED!

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- ☐ Cellulose Acetate
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- ☐ Jewelry Findings
- ☐ Fiberglas-Polyester Resins
- ☐ Carving Tools, Drills
- ☐ Tenite II Screw Driver Handle Stock
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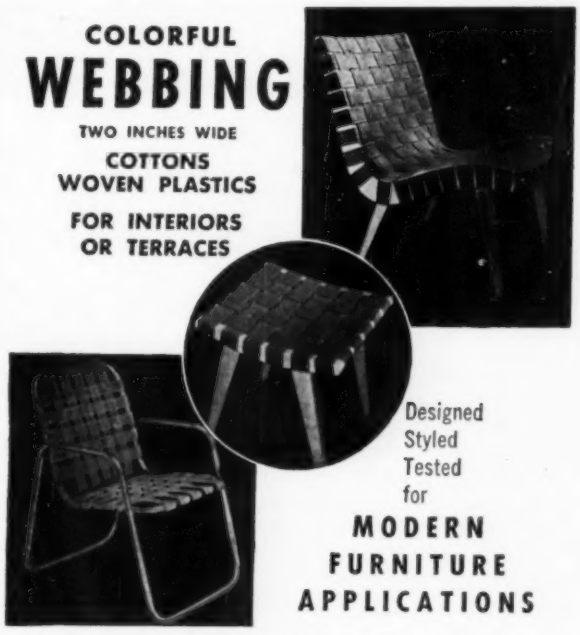

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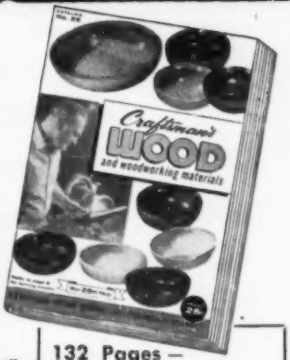

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- Complete lines of archery and upholstering supplies
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- Many new woodworking tools
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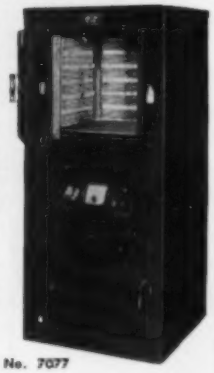
For Hardening, drawing, tempering and annealing or normalizing of dies, punches, gages, fixtures or other parts are performed readily with these redesigned Hotpack Electric Box Furnaces.

This new Hotpack Electric Furnace is fast heat-built for continuous use from 300° to 2000° F. It is the only Furnace equipped with Automatic Controlling-Indicating Pyrometer and also with Limistat control in this price field.



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7075	12"x12"x11"	220 V AC 23 Amp.	430.00
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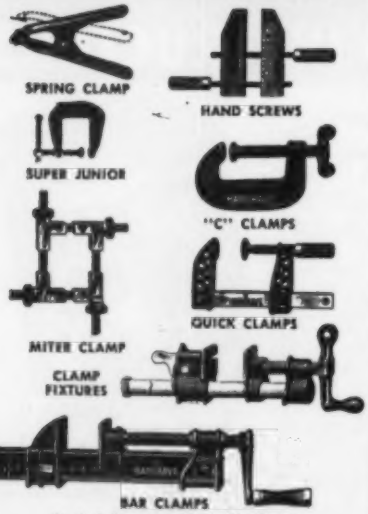

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THE CINCINNATI TOOL CO.
Waverly & Main Cincinnati 12, Ohio

BUSINESS & PERSONAL NEWS

(Continued from page 26A)

Rite OBI Presses and Diebel Hi-Production Presses in the New England States, according to an announcement by George F. Booth, executive vice-president, Sales Service Mfg. Co.

Neff, Kohlbusch & Bissell, Inc., has been appointed to distribute the Diebel Presses in Indiana and Northern Illinois and Wisconsin.

Both Press-Rite and Diebel presses will be distributed in southern Ohio by Walker Machinery Company of Cincinnati. The Oliver H. Van Horn Company will distribute Diebel presses in northern Texas.

Portland Machinery Company, who are distributors for Press-Rite Presses in the Oregon territory have also been appointed distributors for the Diebel Hi-Production Presses.

EDNYFED H. WILLIAMS

Ednyfed H. Williams, long associated with Kester Solder Company in the capacity of vice-president and corporation counsel, passed away September 20, 1958, at the age of 76 years.

GEARON COMPANY IN NEW LOCATION

Gearon Company of Chicago, Ill., announce the opening of their new, modern, air-conditioned sales office and showrooms at Sawyer Avenue and 26th Street, on November 1, 1958.

Descriptive Material

HAMMETT'S CATALOG

J. L. Hammett Company, suppliers of industrial art and occupational therapy supplies, have issued their new catalog No. 578. It describes and illustrates their complete line of educational materials, such as looms, loom parts and accessories, materials for hand weaving, supplies for basketry and chair making, basketry appliances and accessories, articles for decoration, supplies for modeling work, pottery, block printing equipment and tools, metal craft needs, cork craft, toy making, materials for leather working, bookbinding materials, supplies for the art of stenciling, art colors and oil colors, brushes, and other accessories for art work. The catalog also lists books available to those interested in this field.

(For further details encircle index code 1011)

CHALLENGE OFFERS BOOKLET COVERING PRINTING EQUIPMENT

The Challenge Machinery Company have made available their Publication No. 609 entitled "Planning Your School Shop with Challenge Printing Equipment."

This booklet is designed as a helpful aid to school supervisors, shop instructors, or others interested in planning new graphic arts facilities or the expansion of present ones.

The booklet describes and pictures all of the types of Challenge equipment which have proved practical for shop use and which are in widespread use today in printing shops throughout the country. To help you choose the model best suited to your needs, Challenge has included before each section a little helpful advice regarding the particular advantages of the various models shown and their possible application to your shop needs.

Challenge Machinery Company supplies equipment for paper cutting, proofing, and paper drilling for school needs. Special models

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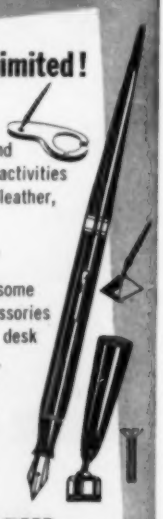
Combination shown at right priced at $5.70 a dozen up for pen, funnel, swivel, screw.



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and special attachments have been developed primarily for school use.

Challenge equipment is available through the leading printing equipment dealers in your locality. For the name of your local dealer representative, or for a copy of this booklet, encircle the code number and sign the card found in the rear of this magazine.

(For further details encircle index code 1012)

NEWLY REVISED DELTA CATALOG

Delta Power Tool Division, Rockwell Manufacturing Company, have issued a newly revised 88-page catalog, describing their line of industrial power tools and accessories.

Some of the industrial tools described are Delta's line of drill presses, grinders, shapers, planers, jointers, metal and wood cutting lathes, tilting arbor saws, unisaws, band saws, and radial saws.

Complete specifications, catalog listings and descriptions of accessories for all tools are included in this two-color catalog. Action photos and drawings supplement the text.

Chain feed control and safety return for the Delta 16–20-in. radial saw, top a list of new accessories designed to broaden the production-line applications of Delta tools.

Other new accessories are included, such as the Slow-Start for 12-in., variable-speed wood lathes, new heavy duty lamp attachments, Slo-Speed for 20-in. drill presses, and the filler block for gap bed wood lathes.

(For further details encircle index code 1013)

NEW PRESS-RITE PRESS CATALOG

Sales Service Mfg. Co., have just issued a new catalog, No. 958, which illustrates and describes the complete line of 2 Ton to 85 Ton Press-Rite O.B.I. presses with full specifications, and detailed description of outstanding features and of optional equipment.

(For further details encircle index code 1014)

SNAP-ON TOOLS CORP. CATALOG

Snap-On Tools Corporation have issued a 112-page catalog of shop and mechanic's hand tools. It lists everything the modern shop and mechanic needs for complete automotive service including the Anal-O-Scope engine analyzer, tune-up meters, gauges, testers, automatic transmission tools, wheel aligners and balancers, hydraulic service and body repair jacks, pullers, valve and valve-seat grinders, tool chests and tool cabs, hand tools, wrenches, sockets, pliers, screw drivers, tool sets, and punches and chisels.

This well illustrated catalog is indexed. Free copy available upon request.

(For further details encircle index code 1015)

SAMS PUBLISHES HANDBOOK

Howard W. Sams & Co., Inc., has announced the publication of *Handbook of Electronic Circuits*. This book contains 76 pp., 8½ by 11 in., and sells for $2. It is sold through electronic parts distributors or can be obtained from Howard W. Sams & Co., Inc. This reference book on important circuits was authored by RCA Service Company, Inc.

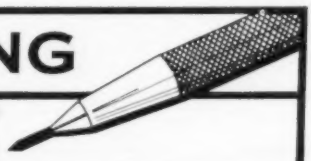
The book is of real value to service technicians, engineers, and students. Covered in this handbook is vital information on: 4-power supply circuits; 14 circuits used in radio stages; 8 circuits used in transmitter stages; 32 stages used in TV receiver stages; and 7 additional circuits having special application.

An analysis of the operation of each circuit is given; a schematic for each is included; a component failure analysis describes various troubles which could occur if particular components in the circuit should fail.

(For further details encircle index code 1016)

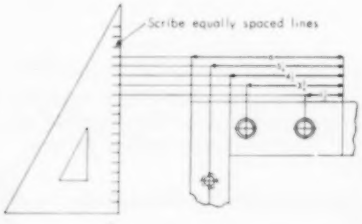
CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

DRAFTING TIPS



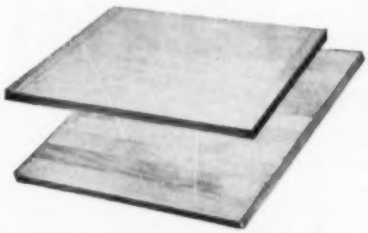
Drawing equally spaced dimension lines

Dimension lines can be equally spaced by scribing a triangle along any vertical side with equally spaced marks. Starting at the base dimension line, vertical witness lines are drawn to each succeeding mark up the scale. This leaves the ends of the witness lines spaced at equal intervals. Horizontal dimension lines are then drawn in by eye from the end of the witness lines, resulting in equally spaced dimension lines.



Important facts on drawing board construction

Through the years many types of woods and production techniques have been used in drawing board construction. These years of manufacture and research have shown that one wood, Basswood, has proved itself superior for use as drawing board stock. Basswood provides the necessary firmness, color, resiliency,



and dimensional stability needed to produce a sturdy, top quality product. Basswood is also economical enough to be well within a school's budgetary requirements. Because of these features POST uses choice stocks of Basswood in all its regular and metal edged drawing boards.

Electronic bonding of the Basswood strips provides stability and greater strength. The Basswood end cleats are joined by tongue-and-groove method and glue bonded for greater resistance to warpage. These advanced methods used in POST's own woodworking facilities permit the production of quality drawing boards for every purpose in every price range.

POST'S own specialized woodworking facilities

A complete line of fine products for drafting and engineering students is made at the POST plant in Owen, Wisconsin. This includes drawing boards, T-squares, scales, precision triangles, curves and many others. Great care is taken to meet POST's rigorous quality standards on each item produced.

For complete information on POST *drawing boards and other products, write the Educational Sales Division, Frederick Post Company, 3648 North Avondale Ave., Chicago 18, Illinois.*

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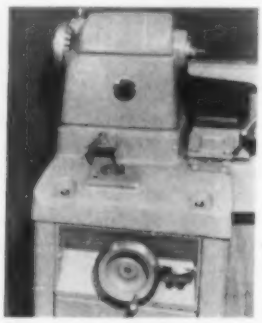
Shop Equipment News

DELTA "SLOW START" SWITCH FOR WOOD LATHES

Delta Power Tool Division of Rockwell Manufacturing Company has introduced a new "Slow-Start" safety switch designed to provide the ultimate in safety for student operators using the Delta 12-in. variable-speed wood lathe.



Delta "Slow Start" Switch for Wood Lathes

The Slow-Start switch makes it impossible for a student to start the lathe at high speeds. It can be stopped at any speed merely by touching the protruding "Stop" button.

Designed specifically for the school shop, the Slow-Start switch kit consists of a limit switch with operating mechanism, switch cover with lock assembly and the necessary wiring.

In operation the lathe's start button is covered and locked in the "on" position by the class instructor. The student must then start or stop the lathe by turning the variable speed hand wheel to the lowest r.p.m. The r.p.m. speed is indicated by an inclined speed indicator on the lathe body. If an emergency stop is made, the student cannot start the lathe again without calling the instructor to unlock the switch cover on the "Start" button.

For advanced students, the cover can be left unlocked for normal "Start-Stop" operation at any speed. The cover can also be locked to prevent lathe operation by unauthorized personnel.

Slow-Start can be used on either manual or magnetic control with single phase, 115/230V; three phase, 208/220V; and a.c. or d.c. motors.

(For further details encircle index code 1001)

NEW CONNECTICUT BANDSAW

W. Whitney Stueck, Inc., has announced their new Connecticut Bandsaw.

The Connecticut Bandsaw has been designed to attain the versatility and power required in the modern shop, and at the same time to sell at a reasonable price. Model A-24-3 satisfies the needs of the general machine shop and fabricator. Model A-24-V is intended for the tool and die trade. Either of these may be equipped with various optional features such as tilting table, blade welder, and power feed.

The high-torque drive is simple but powerful, assuring a maximum of power delivered to the blade at the point of contact with the work, even at the highest speed. Without this, it would be impossible to do both low-speed sawing and high-speed friction cutting successfully on the same machine.

A four-page folder describing the new Connecticut Bandsaw is available upon request. The folder gives general specifications, models, and speeds; also optional features and equipment.

(For further details encircle index code 1002)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

CHANGEABLE DRAWER TOOL STORAGE UNITS

Snap-On Tools Corporation have introduced their new Tool Chest and new Drawer Section with changeable drawer features which enable the user to design his own tool storage unit to meet his own particular requirements.

Engineered to provide versatility, the tool chest has a new changeable drawer feature which permits selection of different size drawers. All deep drawers, all shallow drawers, or a combination of deep, shallow, and medium-depth drawers can be selected. This important feature provides just the right combination for a specific operation. Feature changes can easily be made to accommodate changes in tool storage requirements.

All drawers are nonsag, nonspill, easy running units with full width, roll-type pulls for easy opening from any angle. Overall dimen-

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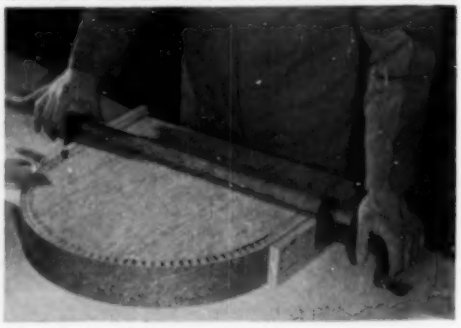

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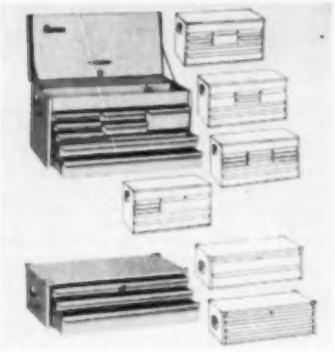


Changeable Drawer Tool Storage Units

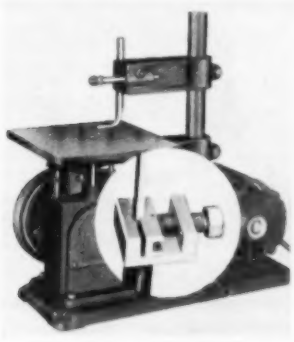
sions of this Tool Chest are 26 by 12 by 14 in. high.

The new drawer section is designed to fit under the tool chest mentioned above and is also available with the new changeable drawer feature. Two shallow drawers can be substituted for the deep drawer or a deep drawer can be substituted for the two shallow drawers. Several drawer sections can be stacked vertically as four raised corners on top of each section permit "nesting" of units. Overall dimensions of this new drawer section are 26 by 12 by 8 in. high.

(For further details encircle index code 1003)

NEW DIE FILER CHUCK

Sales Service Machine Tool Company have recently introduced their new Die Filer Chuck, for easier changing of files on Keller Die Filers.



New Die Filer Chuck

A floating jaw that is tightened by a single screw automatically accommodates itself to any shape of shank. A recess in the chuck post provides extra support for the file shank. It is said that this new chuck allows faster file changing with less adjusting plus faster filing because of the maximum file support provided.

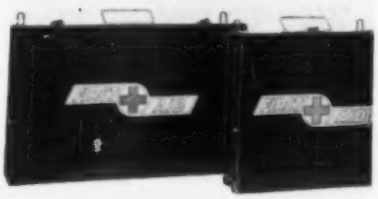
The new chuck is being used on current production of all Keller Die Filers and for replacement on all units now in operation.

Complete information on the new File Chuck for Keller Die Filers is available.

(For further details encircle index code 1004)

NEW HEAVY-DUTY FIRST AID KITS

The General Scientific Equipment Company has announced a new line of heavy-duty unit first aid kits designed to facilitate emergency treatment through the use of unit-wrapped items, boldly labeled and arranged for immediate recognition and access.



New Heavy-Duty First Aid Kits

Each G-S Unit-Type Kit has a facsimile index on the inside of the case lid which shows at a glance the exact location of all items and gives concise instructions for their use. The index also serves as a positive inventory control, since any missing items can be quickly identified from the facsimile table.

Cases are made of 20-ga. steel, finished in either olive green or gray baked-on enamel. Lids are hinged along the entire length of one side and are fitted with a rubber gasket to keep out dust and dampness. Integral mounting brackets and carrying handle permit the kits to be used for permanent wall installation or portable service.

G-S Unit-Type Kits are available in sizes of 10, 16, 24, and 36 units, with standard assortments of first aid items or with "custom" assortments to meet special requirements.

Complete information may be obtained by requesting Bulletin 305.

(For further details encircle index code 1005)

(Continued on next page)

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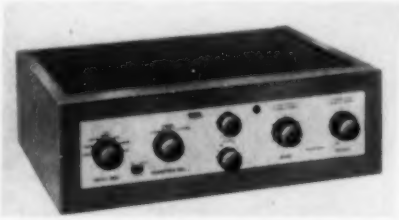
SHOP EQUIPMENT NEWS

(Continued from previous page)

STEREO DUAL AMPLIFIER-PREAMPLIFIER

Electronic Instrument Company have introduced their new Model HF81 Stereophonic Dual Amplifier-Preamplifier in both kit and factory-wired form. It selects, amplifies, and controls *any* stereo source — tape, disks, broadcasts — and feeds it through the self-contained dual 14W amplifiers to a stereo pair of speaker systems. When the source is monophonic, 28 watts (14 plus 14) are available for your two speaker systems.



Stereo Dual Amplifier-Preamplifier

Outstanding features include: separate low-level input in each channel for mag phono, tape head and microphone; separate high-level inputs for AM tuner, FM tuner, FM Multiplex, two auxiliary A inputs and two auxiliary B inputs (one A & B in each channel); gauged level controls and separate focus (balance) control; independent low distortion bars and treble controls in each channel, identical Williamson-type push-pull EL84 power amplifiers with excellent output transformers; hum balance control; attractive "low-silhouette" construction; easy console installation if desired, to any panel thickness, with complete shielding.

For complete specifications and prices write to Electronic Instrument Company.

(For further details encircle index code 1006)

NEW HAND-STROKE BELT SANDER

A catalog sheet on their new 6 by 60-in. hand-stroke belt sander has just been issued by Boice-Crane Company. New features described and illustrated include a machine-tool type base, antifriction bearings, free-rolling worktable, floating motormount and engineering for faster stock removal.

A copy will be sent to anyone addressing a request to Boice-Crane Company.

(For further details encircle index code 1007)

RAPID-ADJUST STEEL SHELVING

Columbia-Hallowell Division of Standard Pressed Steel Company have introduced their easily adjustable shelving which pays for itself in a year, according to the findings of a study of the real first cost of shelving, made by the manufacturers.

Readily repositionable shelves, Columbia-Hallowell found, can actually save 20 or even 30 per cent of the initial capital investment in storage area. That's an immediate saving in installed cost if you are building.

If renting, easy shelf changes can return the cost of the shelving via reduced rentals — in as little as one or two years in high-cost center city areas, or in 3 or 4 years in modern industrial plants.

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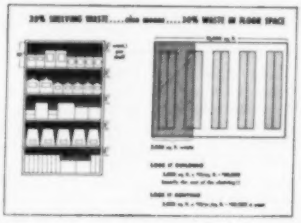


This chart shows price paid for lack of easy shelving

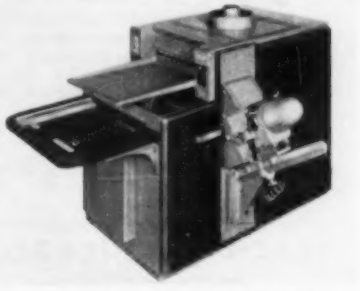
The new line of rapid-adjust steel shelving is called Erectomatic. With really adjustable shelvings arrangements can be changed in a matter of minutes — and therefore frequently. With SPS's Erectomatic, shelves can even be removed and installed without tilting, thus permitting repositioning without unloading.

Price paid for lack of easy shelving adjustability is shown in the accompanying sketch by Columbia-Hallowell Division of Standard Pressed Steel Company. Waste of as little as 3 inches per shelf may mean loss of as much as 30 per cent of usable shelf storage area. A 10,000 square foot warehouse then would have 3000 square feet of needless space and shelving. Even ignoring the cost of the added shelving used, the waste space alone probably cost at least $30,000 to build as part of a new plant. That's nearly the purchase price of all the really adjustable shelving needed for the installation. This loss can be converted to a saving through the use of easily adjustable shelving that cuts down on waste space.

(For further details encircle index code 1008)

BRUNING COPYTRON MODEL 1000 ENLARGER-PRINTER

Charles Bruning Company, Inc., have announced their new electrostatic printer — a compact reproduction machine which makes enlargements of microfilmed drawings and records at a cost of only a few cents per print. Called the Bruning Copytron Model 1000 Enlarger-Printer, the machine is the first to be marketed under the Bruning tradename "Copytron."



Bruning Copytron Model 1000 Enlarger-Printer

The new machine works on a new electrostatic principle to produce permanent, black-on-white enlargements of drawings and records which have been reduced to 35 millimeter microfilm size. It enlarges the microfilm 14 to 16 times and prints the enlargements on standard size sheets ranging from 8½ by 11 in., to 18 by 24 in. The enlarging and printing are done continuously, and finished prints are delivered at the rate of about four per minute.

The Copytron Model 1000 utilizes a low-cost paper capable of holding an electrostatic

(Continued on next page)

AUTOMOBILE ENGINE REBUILDING AND MAINTENANCE

Harold T. Glenn

Specifically designed for use in vocational-technical courses, this new book provides on-the-job training for students of auto machining and auto mechanics. Each chapter is devoted to one phase of the subject. This arrangement enables the student doing a repair job smaller than a complete engine overhaul to refer to the section that applies to the job at hand. Questions at the end of each chapter follow the sequence of the text and enhance the book's value when it is used as a workbook. Filled with 466 work-in-progress illustrations.
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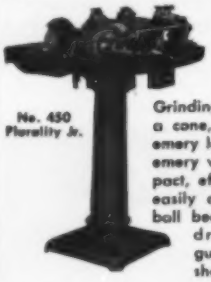

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No. 450 Plurality Jr.

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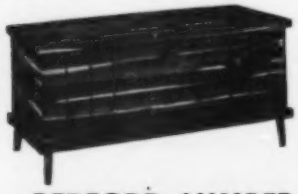

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SHOP EQUIPMENT NEWS

(Continued from previous page)

charge. The machine is self-contained and consists of two main sections — an enlarger unit which projects the image onto the paper, and a reproduction section.

In a continuous, automatic operation, the paper is charged, exposed, and then dry-developed with a charged powder which forms a positive, black-line enlargement on the paper. In a final step, the machine fuses the image on the paper and makes it as permanent as an impression of printer's ink.

Copytron enlargements can be written on, drawn on, and typed on. The machine will accommodate reel, strip, or card-mounted microfilm and incorporates a magnifying scanner which permits the operator to view the microfilm image before the print is made.

Production of the Copytron enlarger-printer will begin this year, with delivery of production models scheduled for next spring. Advance orders are being accepted. Free literature is available.

(For further details encircle index code 1009)

NEW TYPE OF PAPER SPEEDS DIAZO EQUIPMENT OUTPUT

Faster output from diazo machines, with no sacrifice of print density, has been made possible by a new innovation in diazo sensitized papers developed by Keuffel & Esser Company.

The new paper — Helios Blue 11 — is the result of a completely different chemical formulation. In a three-month test users have reported an average time saving of 30 per cent with the new product.

Blue 11 was developed to fill the need for faster paper in certain specific problem areas common to most users of diazo equipment.

These were listed as the three most important applications for the new product:

1. Reproducing from old, worn original drawings which formerly required much slower speeds to obtain satisfactory prints.
2. Reproducing from sepia intermediates.
3. Reproduction on small diazo equipment which, because of lower light intensity, must be run at relatively slow speeds, usually below the capacity of the machine.

The new Helios Blue 11 paper was not designed to replace all other paper speeds, but was primarily for use where slowdowns were a continuing problem. The complete line of Helios papers already on the market will continue to be made available.

Samples of the new paper are available for in-plant testing.

(For further details encircle index code 1010)

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INDEX TO SHOP EQUIPMENT

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Code No.		Page No.
1210	**Adjustable Clamp Company....** Jorgensen and Pony clamps.	10A
1211	**Allied Radio Corp., The.....** Electronic supply guide	25A
1212	**Alvin & Company.....** Ready reference chart with decimal table	25A
1213	**American Gas Furnace Co.....** Heat treating equipment	34A
1214	**American Technical Society.....** Textbook Publishers. Free catalog	24A
1215	**American Wood Type Mfg. Co...** Free catalog graphic arts supplies	32A
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1217	**Atlas Press Company, The.....** Woodworking tools	17A
1218	**Bedford Lumber Co.....** Knockdown cedar chest and aromatic red cedar lumber	34A
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1220	**Board of Examiners.....** Teaching position	34A
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1223	**Bruce Publishing Company.....** Fabricating With Formica	30A
1224	**Can-Pro Company .....** Apron and coats	34A
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1226	**Chilton Company .....** Automobile mechanics book	33A
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1228	**Columbian Vise & Mfg. Co.....** Vises and levels	12A
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1230	**Cope Plastics .....** Plastics supplies	27A
1231	**Craftsman Wood Service Co....** Wood and woodworking equipment catalog free to instructors	27A
1232	**Delta Power Tool Div. Rockwell Mfg. Co. .....** Power tools	2A
1233	**Designers Company .....** Castings for school projects	34A
1234	**Dietzgen Company, Eugene .....** Drafting, surveying and printmaking supplies	2nd cover
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1236	**Driscoll & Co., Martin.....** Inks	34A
1237	**Duro Metal Products Co.....** Power tools	8A
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1248	**Greenlee Tool Co.....** Hand tools	10A
1249	**Hammett Company, J. L.....** Handicraft supplies. Free catalog	28A
1250	**Hardwood Corp. of America...** School shop lumber	20A
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December, 1958

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION
400 North Broadway, Milwaukee 1, Wisconsin

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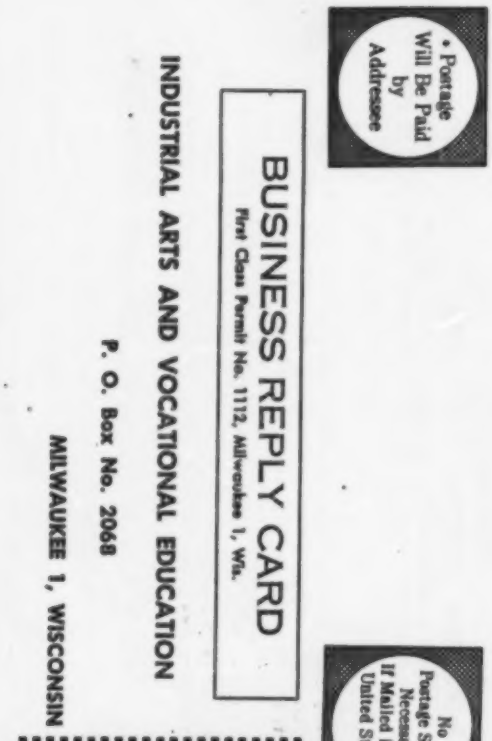
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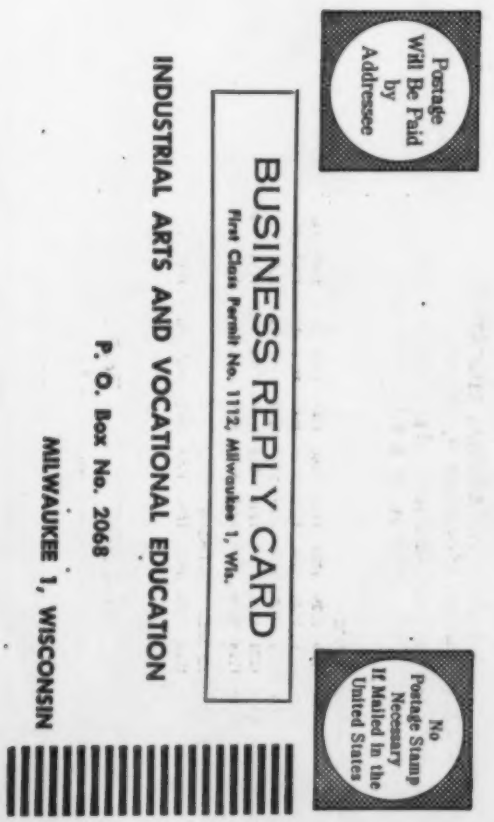
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